REPORT NO.: P WMA 12/000/00/0305

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

MZIMVUBU TO KEISKAMMA WATER MANAGEMENT AREA

MZIMVUBU-MBASHE ISP AREA

Internal Strategic Perspective

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DEPARTMENT OF WATER AFFAIRS AND FORESTRY

DIRECTORATE NATIONAL WATER RESOURCE PLANNING

MZIMVUBU TO KEISKAMMA WATER MANAGEMENT AREA 12

INTERNAL STRATEGIC PERSPECTIVE

OF

MZIMVUBU TO MBASHE ISP AREA

VERSION 1

FEBRUARY 2005

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

DIRECTORATE NATIONAL WATER RESOURCE PLANNING

DEVELOPMENT OF INTERNAL STRATEGIC PERSPECTIVE

FOR THE MZIMVUBU TO MBASHE PORTION OF THE

MZIMVUBU TO KEISKAMMA WATER MANAGEMENT AREA 12

APPROVAL

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INVITATION TO COMMENT

This report will be updated on a regular basis until the Catchment Management Strategy of the Mzimvubu to Keiskamma Water Management Area eventually supersedes it. Water users and other stakeholders in the Mzimvubu to Mbashe ISP Area and the rest of the WMA, are encouraged to study this report and to submit any comments they may have to the Version Controller (see box).

ELECTRONIC VERSION CONTROL

The report is also available in electronic format as follows:

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The CD contains the following reports (all available on the DWAF website):

Mzimvubu to Mbashe ISP Area Internal Strategic Perspective (*this report*) (Report No: P WMA 12/000/00/0305)

Amatole Kei ISP Area Internal Strategic Perspective (Report No. P WMA 12/000/00/0404)

The National Water Resource Strategy, First Edition, 2004

Mzimvubu to Keiskamma WMA: Overview of the Water Resources Availability and Utilisation (Report No: P WMA 12/000/00/0203)

Mzimvubu to Keiskamma WMA: Water Resources Situation Assessment (Report No: P WMA 12/000/00/0101)

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EXECUTIVE SUMMARY

The Department of Water Affairs and Forestry (DWAF), as the custodian of South Africa's water resources, wishes to make optimal use of the resources in promoting economic growth and wealth for all its citizens. A clear understanding of the water resources availability and how it is intended that this water be used is essential. This includes strategies and actions regarding all aspects of water resources management in all the nineteen water management areas (WMAs) in the country. This report covers the Department's internal strategic perspective (ISP) of the Mzimvubu to Keiskamma WMA.

The Mzimvubu to Keiskamma WMA has been split into two ISP areas namely the Amatole – Kei ISP area and the Mzimvubu to Mbashe ISP area. The internal strategic perspective for the Mzimvubu to Mbashe ISP area contains strategies and related management actions which address the management of the water resources, taking into account the socio-economic aspects, the environmental conditions of the area and the need to balance these for the benefit of this deeply rural and poorest area of the country. The ISP identifies the constraints and opportunities related to integrated water resource management to ensure resource sustainability. The objective of this ISP is to provide a framework for DWAF's management of the water resources in the area until the Department (Regional Offices) can hand over its management functions to an established CMA. This will ensure consistency when answering requests for new water licences and informing existing water users (including authorities) on how the Department will manage the water resource within the area of concern.

The methodology combined the collection and synthesis of information from the National Water Resource Strategy (NWRS), Water Management Area (WMA) reports, Water Resource Situation Assessment (WRSA) reports and other catchment study reports on the water resource availability, utilisation and water resource management issues, with interviews with selected key DWAF people,especially from the Eastern Cape Regional Office.The ISP area was further subdivided into four key areas, namely: Mzimvubu, Pondoland, Mtata and Mbashe.

Findings

The extent of water resources development in the ISP area varies considerably. No noteworthy dams have been constructed in the Mzimvubu River catchment, where significant potential for water resource development remains, as also applies to the Mbashe River. The Mtata River is well regulated by the Mtata Dam. Three small hydro-electric developments exist in the ISP area, one on the Mbashe River and two on the Mtata River. An inter-basin water transfer occurs between the Kei and the Mbashe catchments.

The available surface water resources in the Pondoland key area under current development are limited, while there are indications that there is scope for groundwater development to meet the growing domestic water requirements in that key area. In the other key areas, although there is enough surface water resources available to meet likely growth in water requirements, a large number of the rural towns are dependent on groundwater. The quality of the groundwater in the ISP area is good and borehole water requires no treatment. The low borehole success rate may increase the cost of supplying domestic water supply from groundwater.

There are a number of issues, constraints and development opportunities available in the Mzimvubu to

Mbashe ISP area regading water resource management. The ISP has revealed that with the exception of a few localised areas, all four key areas of Mzimvubu, Pondoland, Mtata and Mbashe have surplus water (see Table 1). The projected future water requirements in the ISP area are not expected to increase significantly. Population figures are expected to reduce somewhat because of migration from the rural areas to the urban areas as well as the high prevalence of HIV/AIDS while significant increases in forestry, irrigation, hydropower generation, etc are unlikely, unless stimulated by practical decisions.

Table 1: Reconciliation of available water with requirements for the year 2000 (million m^3/a)

Key area	Available water			Water Requirement			Balance
	Local yield	Transfers in	Total	Local requirements	Transfer out	Total	
Mzimvubu	91	0	91	41	0	41	50
Pondoland	5	0	5	4	0	4	1
Mtata	146	0	146	57	0	57	89
Mbashe	49	102	151	31	0	31	120

The water quality of the ISP area is generally very good with the exception of the urban areas where the existing wastewater treatment works cannot cope with sewage inflow. This ISP area has some of the most prestine estuaries and areas of high ecological importance and sensitivity can be found in the Pondoland key area. However the operation of the existing three hydroelectric schemes has a negative impact on the flow regime required for the ecology.

The utilisation of water in the urban areas was found to be highly inefficient. There are significant water losses in all the urban and rural towns situated in the Mzimvubu to Mbashe ISP area.

On the other hand the Mzimvubu to Mbashe ISP area is deeply rural and very poor and water can contribute to rural development and poverty eradication. The key feature that applies across the Mzimvubu to Mbashe ISP area is that it is well endowed with water. Water alone cannot leverage development and other resources such as human, physical and financial as well as institutional and management support must be available to support such developments. These aspects require integrated resource management.

Therefore the overall objective of water resource management in the Mzimvubu to Mbashe ISP area is the need to utilise the available water for the benefit of local communities in order to improve their welfare, while ensuring that the resource is well protected to ensure the quality of the ecologically highly important and sensitive areas of the ISP area.

Water Resource Management Strategies

Based on the assessment conducted, the following strategies to contribute to poverty eradication and improve the welfare of local communities while protecting the water resource to ensure a high quality ecosystem

function of the ISP area have been put forward:

- Water balance and reconciliation strategy: The DWAF should inform the relevant government departments and the provincial governments of where water is availability of surplus water that can be utilised to improve. It should be noted that water resource development in the Mzimvubu key area should be done in the context that sometime in the future water will be transferred to other areas. Therefore any future developments within the Mzimvubu catchment will be subject to authorisation at national level.

- Reserve and Resource Quality Objectives strategy: Environmental flow assessment for the ISP area should be done within the context of integrated water resource management. There is a need to identify the rivers and estuaries that will require a higher level of water resource protection in order to balance this with the urgent need for rural development to improve the welfare of the communities living in the Mzimvubu to Mbashe ISP area. In order to balance utilisation with resource protetction all aspects of the river and drainage system needs to be considered by looking at environmental, economic, social and cultural values in relation to the entire river system.

- Water Quality Management: The water quality of the Mzimvubu to Mbashe ISP area is generally very good. However there are water quality problems in the Mtata River. Priority should be put on the Mtata River which is being severely impacted with the potential of serious health consequences. DWAF needs to ensure pollution control at the source and develop source-directed control measures for the ISP area. DWAF also needs to engage the local authorities and all relevant agencies responsible for water quality problems experienced in the area. Implementation of the dense settlement programme is essential in Mtata and surrounding areas.

- Water Conservation and Water Demand Management Strategy: DWAF should encourage and assist the water services institutions in the ISP area with the development and implementation of WC/WDM measures that include technical, economic and legal instruments to ensure sustainability of the programme particularly in the urban areas, before further sources of supply are made available. This requires the creation of a culture of water conservation and water demand management (WC/WDM) amongst individual users and within all water management and water services institutions.

- Foresty Management strategy: There is potential for forestry development in the Mzimvubu to Mbashe ISP area, particularly in the Mbashe, Mzimvubu and Pondoland key areas. There is sufficient land and water for forestry expansion in the ISP area. Forestry expansion should be balanced with the need for resource protection in the specific river and drainage system of the ISP area.

- Poverty eradication, emerging farmers and revitalisation of irrigation schemes: DWAF has prioritised water for equity, but not at the expense of efficiency and beneficial use. There is a need for close co-operation between DWAF and the PDoA in providing water for resource poor farmers, provided the water is available and allocations have been prioritised.

- Co-operative Governance: There is an urgent need to promote effective management and co-ordination of water resources in the ISP area through co-operation between DWAF, other government departments, local authorities and parastals. DWAF should continue to be actively

involved in the various co-operative management bodies already established and ensure active involvement in new liaision bodies that are being or will be established to contribute towards improved and sustainable water management for the benefit of local communities in particular and society in general.

- Monitoring and Information management strategies: DWAF must ensure that the monitoring of water resources, both quantity and quality, in the Mzimvubu to Mbashe ISP area, with water quality monitoring particularly in the Mtata key area, is conducted. This will require installation of significant new equipment and infrastructure such as weirs and gauging stations and a major increase in staff capacity.

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LIST OF ABREVIATIONS

amsl	above mean sea level
CCAW	Co-ordinating Committee for Agricultural Water
CMIP	Consolidated Municipal Infrastructure Programme
CMA	Catchment Management Agency
CMS	Catchment Management Strategy
DEAET	Department of Economic, Agriculture, Environment and Tourism
DWAF	Department of Water Affairs and Forestry
DM	District Municipality
DEAT	Department of Environment Affairs and Tourism
ECA	Environmental Conservation Act 73 of 1989
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EFR	Estuarine Freshwater Requirements
EWR	Ecological Water Requirements
GA	General Authorisation
GDP	Gross Domestic Product
GGP	Gross Geographic Product
ISP	Internal Strategic Perspective
IWRM	Integrated Water Resource Management
IDP	Integrated Development Plan
LA	Local Authority
LM	Local Municipality
MAR	Mean Annual Runoff
MC	Management Class
MIG	Municipal Infrastructure Grant
MRBS	Mtata River Basin Study

NWA	National Water Act 36 of 1998
NWRS	National Water Resource Strategy
NEMA	National Environmental Management Act 107 of 1997
NGDB	National Groundwater Data Base
PESC	Present Ecological Status
PGDS	Provincial Growth and Development Strategy
PDOA	Provincial Department of Agriculture
RO	Regional Office
RQO	Resource Quality Objectives
RDM	Resource Directed Measures
ROD	Record of Decision
SWCA	Subterranean Water Control Area
SDI	Spatial Development Initiative
SFRA	Streamflow Reduction Activity
STW	Sewage Treatment Works
SEA	Strategic Environmental Assessment
WMA	Water Management Area
WSDP	Water Services Development Plan
WTW	Water Treatment Works
WwTW	Wastewater Treatment Works
WMI	Water Management Institution
WC/WDM	Water Conservation and Water Demand Management
WSA	Water Services Act 108 of 1997
WUA	Water User Association
WSA	Water Services Authority
WSP	Water Services Provider

GLOSSARY OF TERMS

Aquifer	A Stratum or Zone below the surface of the earth capable of producing water.
Assessment (Water Resources Assessment)	An examination of the aspects of the supply and demand for water and of the factors affecting the management of water.
Assurance of Supply	The reliability of which a specified quantity of water can be provided, usually expressed either as a percentage or as a risk. For example "98% reliability" means that over a long period of time, the specified quantity of water can be supplied for 98% of the time, and less for the remaining 2%. Alternatively, this situation may be described as a "1 in 50 year risk of failure" meaning that, on average, the specified quantity of water will not fail to be provided in 1 year in 50 years, or 2% of the time.
Basin	The area of land that is drained by a large river, or river system.
Biota	A collective term for all the organisms (plants, animals, fungi, bacteria) in an ecosystem.
Catchment	The area of land drained by a river. The term can be applied to a stream, a tributary of a larger river or a whole river system.
Comprehensive water resources management	Water resources planning, development, and control that incorporates physical, social, economic and environmental interdependencies.
Cost Recovery	Fee structures that cover the cost of providing the service or investment.
Condensed Area	The equivalent area of invasive alien plants with a maximum concentration / density that represents the more sparsely distributed invasive alien plants that occur over a large area.
Ecological Category	Ecological Category (A-D). A class indicating the ecological importance and sensitivity of an area, as it is likely to have been under natural (undeveloped) conditions and the risks of disturbance that should be tolerated. Values range from Category A (highly sensitive, no risks allowed) to category D (resilient systems, large risk allowed).
Water Demand Management	The use of price, quantitative restrictions, and other devices to limit the demand for water.
Drainage Region	The drainage regions referred to in this document are either single large

	river basins, or groups of contiguous catchments or smaller catchments with similar hydrological characteristics. They follow the division of the country into drainage regions as used by the Department of Water Affairs and Forestry.
Ecosystem	A complex system formed by the interaction of a community of organisms with its environment.
Ecosystem health	An ecosystem is considered healthy if it is active and maintains its organisations and autonomy over time, and is resilient to stress. Ecosystem health is closely related to the idea of sustainability.
Ecological importance	A measure of the extent to which a particular species, population or process contributes towards the healthy functioning of an ecosystem. Important aspects include habitat diversity, biodiversity, the presence of unique, rare or endangered biota or landscapes, connectivity, sensitivity and resilience. The functioning of the ecosystem refers to the natural processes.
Edaphic	Pertaining to the influence of soil on organisms, or resulting from or influenced by factors inherent in soil rather than by climatic factors.
Endemic	Occurring within a specified locality; not introduced.
Endoreic	Portion of a hydrological catchment that does not contribute towards river flow in its own catchment (local) or to a river flow in downstream catchments (global). In such catchments the water generally drains to pans where much of the water is lost through evaporation.
Ephemeral rivers	Rivers where no flow occurs for long periods.
Historical Flow Sequence	A record of river flow over a defined period and under a defined condition of catchment development in the past, calculated from a record of observed flow corrected for inaccuracies, or from records of observed rainfall, or a combination of the two.
Hydrological year	The twelve-month period from the beginning of October in one year to the end of September in the following year.
Irrigation quota	The quantity of water usually expressed as m^3/ha per year, or mm per year, allocated to land scheduled under the scheme. This is the quantity to which the owner of the land is entitled at the point at which he or she takes delivery of the water and does not include conveyance losses to that point.
Mean Annual Runoff	Frequently abbreviated to MAR, this is the long-term mean annual flow

	calculated for a specified period of time, at a particular point along a river and for a particular catchment and catchment development condition. In this report, the MARs are based on the 70-year period October 1920 to September 1990 inclusive.
Opportunity cost	The value of goods or services foregone, including environmental goods and services, when a scarce resource is used for one purpose instead of for its next best alternative use.
Opportunistic irrigation	Irrigation from run-of-river flow, farm dams, or compensation flows released from major dams. As storage is not provided to compensate for reduced water availability in dry years, areas irrigated generally have to be reduced in dry years.
Poverty Gap	The sum of the differences between the income of each household and the poverty line. This measure is important since it indicates the theoretical minimum government transfer that is required to poor households to totally eliminate poverty. It also inicates the amount of income generating opportunities for poor people that needs to be created with the capcity to use the opportunities.
Present Ecological Status Class	A Class indicating the degree to which present conditions of an area have been modified from natural (undeveloped) conditions. Factors that are considered in the classification include the extent of flow modification, inundation, water quality, streambed condition, riparian condition and proportion of exotic biota. Values range from Class A (largely natural) to Class F (critically modified).
Quaternary Catchment	The basic unit of area resolution used in the WR90 series of reports published by the Water Research Commission and also in this report. The primary drainage regions are divided into secondary, tertiary and quaternary catchments. The quaternary catchments have been created to have similar mean annual runoffs: the greater the runoff volume the smaller the catchment area and vice versa. The quaternary catchments are numbered alphanumerically in downstream order. A quaternary catchment number, for example D41A, may be interpreted as follows: the letter D denotes Primary Drainage Region D, the number 4 denotes secondary catchment 4 of Primary Drainage Region D, the number 1 shows that the secondary catchment has, in this case, been sub-divided into tertiary catchments, and the letter A shows that the quaternary catchment is the first in sequence downstream from the head of secondary catchment D41.
River basin	A geographical area determined by the watershed limits of a system of water, including surface and underground water, flowing into a common

	terminus.
Reserve	The quantity and quality of water required (a) to satisfy basic human needs by securing a basic water supply, as prescribed under the Water Services Act, 1997 (Act No.108 of 1997) for people, who are now or who will, in the reasonably near future, be supplied from the relevant water resource; and (b) to protect aquatic ecosystems in order to secure ecologically sustainable development and use of the relevant water resource as indicated in the National Water Act (Act No 36 of 1998).
Resilience	The ability of an ecosystem to maintain structure and patterns of behaviour in the face of disturbance or the ability to recover following disturbance.
Resource Quality	The quality of all the aspects of a water resource including: (a) the quantity, pattern, timing, water level and assurance of instream flow; (b) the water quality, including the physical, chemical and biological characteristics of the water; (c) the character and condition of the instream and riparian habitat; and (d) the characteristics, condition and distribution of the aquatic biota.
Resource Quality Objective	Quantitative and variable statements about water quantity, water quality, habitat integrity and biotic integrity that specify the requirements (goals) needed to ensure a particular level of resource protection.
River System	A network of rivers ranging from streams to major rivers and, in some cases, including rivers draining naturally separate basins that have been inter-connected by manmade transfer schemes.
Scheduled Land	Irrigable land to which a water quota has been allocated.
Sensitivity analysis	Assessment of the response of some factors as a result of changes in others.
Sewage	Liquid refuse or waste matter carried off by sewers.
Sewerage	The removal and disposal of sewage and surface water by sewer systems.
Subsistence Farming	Small-scale farming where almost all produce is consumed by the farmer's household or within the local community.
Suggested Ecological Management Class	A class of water resource indicating the suggested management objectives of an area which could possibly be attained within five years. Values range from Class A (largely natural) to Class D (largely modified).
Stakeholder	Organization or individual that is concerned with or has an interest in water resources and that would be affected by decisions about water resources

	management.
Strategy (Water Resources Strategy)	A set of medium to long-term action programs to achievement of development goals and to implement water-related policies.
Water Imports	Water imported to one drainage basin or secondary subcatchment from another.
Water Transfers	Water transferred from one drainage basin or secondary sub-catchment to another. Transfers in are synonymous with water imports.
Watercourse	A river or spring, natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which or form which water flows.
Watershed	An area by a river or stream system; also referred to as a catchment area on which rain falls before running into rivers and/or seeping into the ground.
Wetlands	Areas of marsh, fen, peat land, or water that include natural, artificial, permanent, and temporary areas with static or flowing water that is fresh.
Yield	The maximum quantity of water obtainable on a sustainable basis from a dam in any hydrological year in a sequence of years and under specified conditions of catchment development and dam operation.

PART 1 – INTRODUCTION AND OVERVIEW OF MZIMVUBU TO MBASHE ISP AREA

1 CHAPTER 1: BACKGROUND TO THE MZIMVUBU TO MBASHE ISP AREA: INTERNAL STRATEGIC PERSPECTIVE

1.1 INTRODUCTION

The Department of Water Affairs and Forestry (DWAF), as the custodian of South Africa's water resources, wishes to make optimal use of these resources in promoting economic growth and wealth for all its citizens. On the other hand, armed with the National Water Act (NWA) and other legislation, it has the difficult responsibility of ensuring that such water utilisation is sustainable, and especially ensuring the sustainability of our natural environment.

The following document presents DWAF's strategic perspective on how it wishes to protect, allocate use, develop, conserve, manage and control the water resources within the Mzimvubu to Mbashe catchments until the regional responsible authority (to be known as the Catchment Management Agency or CMA) has been established and is in a position to take over most or all of these functions.

In keeping with sound business practice, the Eastern Cape Regional Office (RO) of the Department, assisted by the Directorate: National Water Resource Planning together with the other relevant DWAF Head Office Directorates has focussed on the following in preparing this document:

- Understanding what their core business is in conducting their interim water resource management functions (these must be in line with DWAF's Vision, Mission, Policy Objectives, the NWA, the recently drafted National Water Resource Strategy, and all NWA implementation processes);
- Clear management objectives and the setting of desired deliverables;
- Obtaining a thorough understanding of the natural, social, economic, political and other environments in the Mzimvubu to Mbashe catchments in which they have to perform their strategically important responsibilities. This is crucial to ensuring that the service they deliver optimises benefits for all water users by integrating all planning, implementation and management activities;
- A clear understanding of the water resources availability and how it is intended that this water be used. Reconciliation of water requirements and availability, as well as optimisation of river and water system operations, in the best interest of the country and the regional economy, is fundamental to the success of this management role;
- Providing a concise overview of the way in which DWAF will manage the business at hand. This includes strategies and actions regarding all aspects of water resources management in the WMA. Where no clear policy or approach exists, a strategy to obtain better decision support information is proposed; and
- Business infrastructure and human resources that need to be assigned to each task or function. Prioritisation of these tasks and functions, including work scheduling.

The structure of this (DWAF) Internal Strategic Perspective (ISP), or interim management strategy, has been

prepared in such a way that the reader is provided with the necessary background along with the water resources issues and management approach to be adopted by the Department. This includes motivations as to how these approaches are intended to benefit all by ensuring equity of access to water, sustainability in maintaining the balance of utilisation by natural ecosystems and water users, and efficient and effective water use.

1.2 LOCATION OF THE MZIMVUBU -KEISKAMMA WMA

The Mzimvubu to Mbashe ISP Area forms a major part of the Mzimvubu to Keiskamma WMA, the locality of which is shown in Figure 1.1. The WMA has been split into two ISP areas namely the Amatole – Kei ISP area and the Mzimvubu to Mbashe ISP area. The split was done because of the fundamental differences and the size of the key areas.

Figure 1.1: Locality map of Mzimvubu to Mbashe ISP area

1.3 WATER LEGISLATION AND MANAGEMENT

Water is one of the most fundamental and indispensable of all natural resources. It is fundamental to life and the quality of life, to the environment, food production, hygiene, industry, and power generation. The availability of affordable water can be a limiting factor for economic growth and social development, especially in South Africa where water is a relatively scarce resource that is distributed unevenly, geographically and through time, as well as socio-politically.

Prosperity for South Africa depends upon sound management and utilisation of our many natural and other resources, with water playing a pivotal role. South Africa needs to manage its water resources optimally in order to further the aims and aspirations of its people. Current government objectives for managing water

resources in South Africa are set out in the National Water Resources Strategy (NWRS) as follows:

- To achieve equitable access to water that is equity of access to water services, to the use of water resources, and to the benefits from the use of water resources.
- To achieve sustainable use of water, by making progressive adjustments to water use to achieve a balance between water availability and legitimate water requirements, and by implementing measures to protect water resources and the natural environment.
- To achieve efficient and effective water use for optimum social and economic benefit.

The NWRS also lists important proposals to facilitate achievement of these policy objectives that include the following:

- Water will be regarded as an indivisible national asset. The Government will act as the custodian of the nation's water resources, and its powers in this regard will be exercised as a public trust.
- Water required to meet basic human needs and to maintain environmental sustainability will be guaranteed as a right, whilst water use for all other purposes will be subject to a system of administrative authorisations.
- The responsibility and authority for water resource management will be progressively decentralised by the establishment of suitable regional and local institutions, with appropriate community, racial and gender representation, to enable all interested persons to participate.

1.3.1 The National Water Act (NWA)

The NWA of 1998 is the principal legal instrument relating to water resource management in South Africa. The Act is now being implemented incrementally. Other recent legislation, which supports the NWA, includes the Water Services Act (Act 108 of 1997) and the National Environmental Management Act (Act 107 of 1998).

1.3.2 The National Water Resource Strategy (NWRS)

The NWRS is the implementation strategy for the NWA and provides the framework within which the water resources of South Africa will be managed in the future. All authorities and institutions exercising powers or performing duties under the NWA must give effect to the NWRS. This strategy sets out policies, strategies, objectives, plans, guidelines, procedures and institutional arrangements for the protection, use, development, conservation, management and control of the country's water resources. The purpose of the NWRS is to provide the following:

(i) The National framework for managing water resources;

(ii) The framework for preparation of catchment management strategies in a nationally consistent way;

(iii) Information, in line with current legislation, regarding transparent and accountable public administration; and

(iv) The identification of development opportunities and constraints with respect to water availability (quantity and quality).

1.3.3 Catchment Management Strategies (CMS)

The country has been divided into 19 Water Management Areas (WMAs). The delegation of water resource management from central government to catchment level will be achieved by establishing Catchment Management Agencies (CMAs) at WMA level. Each CMA will progressively develop a Catchment Management Strategy (CMS) for the protection, use, development, conservation, management and control of water resources within its WMA.

The Department's eventual aim is to hand over certain water resource management functions to CMAs. Until the CMAs are established and are operational, the Regional Offices (ROs) of DWAF will have to continue managing the water resources in their areas of jurisdiction.

1.4 INTERNAL STRATEGIC PERSPECTIVES (ISPS)

1.4.1 The Objectives of the ISP Process

The objective of this ISP is to provide a framework for DWAF's management of the water resources in each Water Management Area, until the Regional Offices can hand over its management functions to an established CMA. This will ensure consistency when answering requests for new water licences and informing existing water users (including authorities) on how the Department will manage the water resource within the area of concern. Stakeholders need to be aware of the bigger picture, as well as the management detail associated with each specific water resource management unit.

1.4.2 Approach Adopted in Developing the ISP

The ISP for the Mzimvubu to Mbashe ISP Area was developed in five stages as follows:

(i) Determining the current status of water resource management and relevant water resource management issues and concerns in the Mzimvubu to Mbashe ISP Area. This was achieved through interviews with individual members of DWAF's Regional Office and by collating information from the NWRS, WMA reports, Water Resource Situation Assessment (WRSA) reports and other catchment study reports. The following topics were discussed with Regional Office staff and their issues and concerns documented:

- ❑ Water availability
- ❑ Water quality
- ❑ Resource Protection
- ❑ Water Use
- ❑ Water Reconciliation
- ❑ Water Infrastructure
- ❑ Monitoring and Information
- ❑ Water Management Institutions
- ❑ Co-operative Governance

- ❑ Planning Responsibilities.

A starter document of the identified issues and concerns was produced as a discussion document for the first workshop.

(ii) The first workshop was held with attendees from the Regional Office, the Integrated Water Resource Planning (IWRP) Chief Directorate of the Department as well as the consulting team. The workshop focussed on the lists of general issues in the WMA as well as area-specific issues. The issues were clarified and refined during the workshop. Strategies were discussed and developed to address the issues.

(iii) The third stage involved the preparation of the second workshop document to be used for refining strategies to address the various issues and concerns, during the second workshop.

(iv) The fourth stage was the second workshop. During this workshop the overall management of the water resources in the catchment was discussed along with the ISP management strategies and the relevant issues and concerns. The priorities and responsibilities for carrying out the strategies were identified. Attendees of the first workshop were again involved, as were representatives of several DWAF Head Office directorates.

(v) The fifth stage was the finalisation of the ISP document.

As can be deduced from the above, this Mzimvubu to Mbashe ISP was prepared internally within the Department, and captures the Department's perspectives. Once approved by the DWAF Management, it is intended that the Regional Office will make the ISP available to Water User Associations (WUAs), Water Service Providers (WSPs), Water Service Authorities (WSAs) and other forums for discussion and comment. These comments will be considered and worked into later versions of the ISP. By adopting this procedure this ISP becomes a working document, which will be progressively updated and revised by DWAF. Public participation forms part of the CMS process, for which the ISP serves as a foundation (see Paragraph 1.7 and the Implementation Strategy 9).

The ISP does not formulate all the details pertaining to every strategy but provides a suggested framework for each strategy around which the details will be developed by the responsible authority. Where relevant and readily available, certain details have been included in the strategies. The responsible authority for the further development of each strategy is indicated. For the most part this is the Regional Office, which remains responsible for involving the relevant DWAF directorates.

1.4.3 Updating of the ISP Report

The ISP strategies should not lag behind national developments, become outdated, or differ from related ISPs regarding trans-boundary management. There is therefore a need to have a standard process for updating strategies, and to prevent strategies becoming outdated by ensuring adequate feedback from national developments. The introduction of new strategies needs to be accommodated. It is suggested that each strategy has a version-control system. The following is necessary:

- ❑ Keep abreast of changes in national legislation and policy changes or refinements by keeping a list of all relevant legislation and supporting documents relevant to the ISP;

- ❑ Ensure consistency between the ISP strategies and national strategies through a regular review-and-

update procedure;

- Annually review and ensure consistency and agreement regarding trans-boundary ISP management issues by liaising with the responsible managers of other areas and updating relevant ISP strategies if necessary;
- Annually review the priorities of required management actions and align budgets accordingly;
- Monitor the implementation of the ISP (review actions, progress, implementation and stumbling blocks);
- Incorporate feedback from stakeholders;
- Updating and Version Control.

Revision of this ISP will depend on the need. All updates to this report, particularly with respect to amendment to the Strategies, need to be passed on to and vetted by the Catchment Manager for the Mzimvubu to Keiskamma WMA.

1.4.4 The Authority of Information Contained in the ISP

The NWRS is a statutory document, subject to a high level of public scrutiny and input, and signed off by the Minister. The NWRS contains the best information and knowledge available at the time of its preparation. The information in Chapter 2 and Appendix D of the NWRS Strategy on water requirements, availability and reconciliation was updated with comments received from the public participation process in the second half of 2002. To enable the finalisation of the NWRS, these figures were "closed" for changes in February 2003.

Underlying the figures in Chapter 2 and Appendix D of the NWRS is a set of 19 reports "Overview of Water Resources Availability and Utilisation", one for each WMA. These reports contain more detailed information on each WMA than was summarised for the NWRS and are referred to, in short, as WMA Reports. The WMA reports were also finalised with the February 2003 information.

Still deeper in the background lies another set of reports (one per WMA). These are the Water Resource Situation Assessment Reports. These reports contain a wealth of information on each WMA, but the figures on requirements, availability and reconciliation have been superseded by the WMA report and the NWRS.

The ISPs for all WMAs used the information contained in the NWRS and WMA reports as the point of departure. However, an inevitable result of the ISP process has been that better information has in some cases emerged. The level of study has been more detailed and intense for the ISP. This has included very close scrutiny of the numbers used in the NWRS, and in some cases a reworking of base data and some re-modelling. Where the ISPs contain yield balance data differing from the NWRS, these discrepancies are carefully explained, as are all other instances of divergence.

It is required that the Department work with the best possible data so that the best possible decisions can be taken. Where the ISPs have improved upon the NWRS then this is the data that should be used. The new data contained in the ISP will also be open to public scrutiny with the ISP reports published on the Internet and in hardcopy, and presented and discussed at WMA forums. Comments received will be considered and worked into subsequent versions of the ISP on a regular (annual) basis. The NWRS will be updated to reflect the latest understanding in each new edition.

1.5 INTEGRATED WATER RESOURCE MANAGEMENT (IWRM)

It is imperative that the natural, social, economic, political and other environments and their various components are adequately considered when conducting water resources planning and management. Water as a strategic component also interacts with other components in all environments. For example, human activities such as the use of land, the disposal of waste, and air pollution can have major impacts on the quantity and quality of water, which is available for human use and for proper life support to natural biota.

Taking an even broader view, water must also be managed in full understanding of its importance for social and economic development. It is important to ensure that there is conformity between the water-related plans and programmes of the CMAs, and the plans and programmes of all other role players in their management areas. The CMAs must therefore establish co-operative relationships with a wide range of stakeholders, including other water management institutions, water services institutions, provincial and local government authorities, communities, water users ranging from large industries to individual irrigators, and other interested persons.

This integrated planning and management approach is intended, through co-operative governance and public participation, to enable water managers to meet the needs of all people for water, employment, and economic growth in a manner that also allows protection and, where necessary, rehabilitation of aquatic ecosystems. Above all, Integrated Water Resource Management (IWRM) will enable water managers to use our precious water resources to assist us in poverty eradication and removal of inequity.

One of the big opportunities to formally integrate a large number of actions in water resource management presents itself during the Compulsory Licensing process.

Compulsory licensing is identified in the NWRS as a very important action for implementing the NWA. However, it is not a simple action of issuing licences but a complex process of closely related and interdependent activities that will in itself formalise IWRM to a great extent. The process of IWRM is diagrammatically depicted in Figure 1.2.

Before an allocation schedule can be determined and the legal steps followed to finalise compulsory licensing (through the issuing of licences to all users), many other aspects must be addressed:

1. Existing use and the lawfulness of that use must be verified; all users (existing and new) must apply for licences; a good understanding of future use scenarios must be developed; and water required for equity purposes and rural development must be clearly understood.

2. Water availability must be understood as thoroughly as possible with "best available" existing information used to model all possible reconciliation options.

3. Reserve scenarios must be developed for all significant resources in the catchment, for instance, the river flow requirements for all possible classes that may be considered.

4. The development of strategies for implementing the licensing (abstraction controls, for example), the Reserve and Resource Quality Objectives (i.e. incrementally over time) must go hand in hand with the rest of the processes to ensure that practical, workable solutions are found.

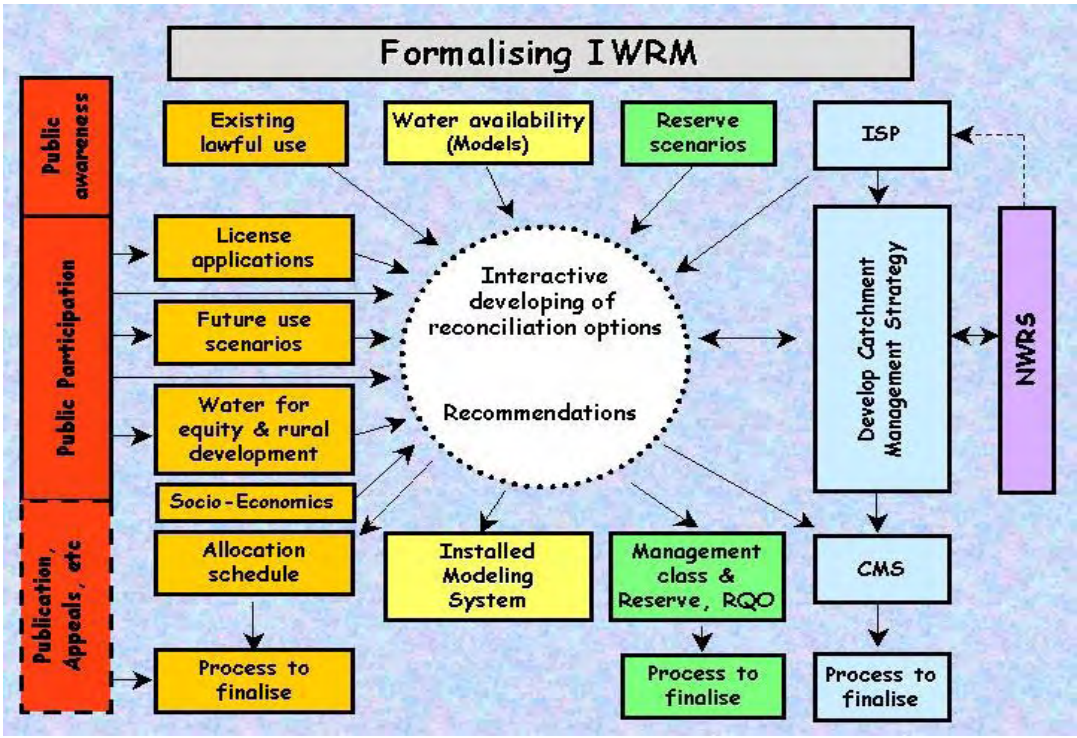


Figure 1.2: Diagram showing DWAF Integrated Water Resource Management approach

The processes will then enter a very intensive, interactive phase of developing realistic reconciliation options. This would entail, for example, the selection of a specific management class to be scrutinised for its impact on the number of licences that could be issued for use, with its concomitant impacts on the social and economic structure of the catchment.

The active participation of stakeholders in this process will then hopefully crystallise clear recommendations on an allocation schedule, management classes for the various reaches of the rivers and the resultant ecological Reserve and Resource Quality Objectives, as well as strategies for implementation.

Although the Department will play a very strong role in guiding this process, it is extremely important to have the CMA actively involved. Preferably, at least the Board of the CMA must be in place to drive the public participation for the process.

1.6 CARING FOR THE ENVIRONMENT

The DWAF is responsible for water resource development and management in terms of the NWA, and within the broader framework of other environmental legislation. The Department also strongly reflects the will to make sound decisions which ensure the development of society and the economy whilst maintaining, and where possible enhancing, ecological integrity. The concept of management of the environment has evolved from the exclusivity of protection of plants and animals to balancing the complex interaction of society, the economy, and ecology. "Environmental management is the integration of social, economic and ecological factors into planning, implementation and decision-making so as to ensure that development serves present and future generations" (NEMA).

The key legislative Acts to which DWAF is required to refer are the National Environmental Management Act

(NEMA, Act 107 of 1998) and the Environment Conservation Act (ECA, Act 73 of 1989). DWAF has prepared a Consolidated Environmental Implementation and Management Plan (CEIMP) as a requirement of NEMA. This describes the Department's functions, policies, plans and programmes, and states how these comply with environmental legislation. Through the CEIMP the Department has committed itself to developing and implementing an integrated Environmental Management Framework (EMF) to ensure that its approach is aligned with the principles prescribed in NEMA and the ECA. The EMF will inform the Department at a strategic decision-making level, bring about environmental legal compliance, and help in achieving environmental sustainability through the promotion of sound environmental management practices. Integrated Environmental Management is a co-operative governance effort with DWAF as a full partner in the process.

This ISP has the responsibility of raising and maintaining the environmental consciousness of the Department's water resource planners and managers. The control over water has a very broad range of influence and impact for which strategies and planning need to account. Impacts come from many different angles.

Some of these angles of impact, which are considered through this ISP, are noted below:

- The direct impact of physical structures (environmental constraints to construction, e.g. of weirs or dams).
- The implications of allocating and licensing water for use. Forestry and irrigation are examples of users where development based on water can mean the transformation of extensive areas of otherwise 'natural' environments.
- The allocation of water for equity. Here we can include approaches towards the application of Schedule 1 Use, General Authorisations, the revitalisation of irrigation schemes, etc.
- Failure to support equity, or appropriate development – noting the consequential impacts of poverty.
- Sanitation systems and the impacts on groundwater quality.
- The implementation of the Reserve.
- The ability to monitor and manage compliance, thus protecting the resource and with it the environment.

All decisions regarding water are critical to the environment. Decisions must be made on a balance of social, economic and ecological costs and benefits, considering both the immediate and the long-term, and always with an eye out for the unintended consequence. It is the intention of the ISP to provide the basis for integrated decision-making. The principles of environmental management underpin every strategy developed in this document.

There are a number of strategic areas with a particularly strong biophysical/ecological emphasis. These include:

- The Reserve (groundwater, rivers, wetlands and estuaries)
- Water quality - surface and groundwater

- The approach towards the clearing of Invasive Alien Plants
- The management of wetlands
- Land degradation erosion and sedimentation (land-care)
- Land use and especially how this is impacted on by land reform and the re-allocation of water.

The role of Co-operative Governance and the need for awareness raising and capacity building are key strategic elements of many strategies.

In reality, all strategies and all aspects of management have a strong interaction with the biophysical environment. This ISP endeavours to capture all of these concerns in discussion and through a strategic approach, which emphasises the will of the Department to manage the environment to the best benefit of the country and its people.

The approach set out above applies to all Water Management Areas and associated ISPs, and is not repeated within the Strategy Tables (Part 2 of this ISP). It reflects the way the Department views Integrated Water Resource Management and the importance of the biophysical aspects of decision-making. There may nevertheless be specific ecological and biophysical aspects of management, which require specific attention and which may not be captured in the above-mentioned or other strategies. The ISP therefore still includes an Environmental Strategy, which serves to make pertinent those issues of the environment, which might not otherwise be covered.

1.7 THE SOCIAL ENVIRONMENT

The utilisation of water resources is aimed at the benefit of society, and at society through the economy. As noted in Section 1.5 this should not be at undue cost to ecological integrity.

Impacts on society are a key element of this ISP, although taking into account the protection of the natural resources on which communities are dependent on. The implementation of the ecological Reserve may benefit the river as well as communities directly or indirectly dependent on the river, to the intended benefit of society, but this has to be balanced by the use of that water out of the river to support social and economic development for the benefit of society.

The implementation of the NWA requires that society be kept at the forefront of all decision-making. This principle is now deep-seated within the Department and is integral to all strategies. Water resource allocation and use has critical social impacts, as does water quality management. But pivotal to the social component is the question of equity. What can be done and what is being done to redress past inequities? Within this, strategies have been developed to consider the provision of water to Resource Poor Farmers, the use of water under Schedule 1, Licensing and General Authorisations, etc. Whilst water supply and sanitation are not part of the brief of the ISP, the provision of water to meet these needs most certainly is. The urban poor, and the poor in rural villages, are as important in the consideration of the distribution and use of water resources as are the rural subsistence poor.

This ISP aims to see water benefiting society. This can be through access to water in livelihood strategies, through small-farmer development programmes, through water supply and sanitation and especially the provision of good quality drinking water, and through the maintenance and growth of income-producing, job-

creating, and tax paying agricultural, commercial and industrial strategies.

Consultation and public participation are cornerstones of the social component of any strategic document. These requirements are repeatedly stressed throughout the National Water Act. This ISP has been prepared as DWAF's position statement with respect to the management of water resources and, although strategies and plans have been captured without consultation with the stakeholders, it remains an open and transparent document where the understanding of the Department, its visions and its principles are made clear for all to see and to interact with. This is amplified in the Implementation Strategy (Strategy 9.1) of this ISP.

1.8 WATER QUALITY MANAGEMENT

Much of the emphasis in water resource management has revolved around ensuring that users have sufficient quantities of water. However, as more water gets used and re-used, as quantities get scarce and feedback loops get even tighter, it is quality that begins to take on a dominant role.

Water availability is only as good as the quality of that water. Both quantity and quality need to be considered at the correct level of detail, and this can mean that at times they should be considered with similar emphasis and with similar expenditure of resources. The concept of Available Assimilative Capacity, the ability of the water resource to absorb a level of pollution and remain 'serviceable', is as important in water resource management as is the concept of Systems Yield.

Quantity and quality can no longer be managed in isolation of each other. Not that this isolation has ever been total. The importance of managing the current overflow of untreated sewage into the Mtata River, whose water is abstracted for domestic purposes by downstream users and also supports the functioning of the estuaries, cannot be overemphasised. The consequences of irrigation, the leaching of fertilisers, and more importantly the leaching of salts from deeper soil horizons can render both the lands themselves and the receiving rivers unsuitable for use. Diffuse agricultural 'effluent' may be less visible than direct discharges of sewage or industrial effluent, but are no less pernicious.

Direct discharges to rivers are licensed and managed on the basis of assimilative capacities of those rivers, and on Receiving Water Quality objectives. Where these limits are exceeded, often through the cumulative impact of diffuse discharges, water becomes unavailable or unsuitable for use to some, or even all, users downstream. This is the case in some of the catchments of the Mzimvubu to Mbashe ISP area. DWAF will licence users to take water, and again to discharge it in recognition that there is generally a cost to the resource in terms of a reduction in quality and a reduction in its further assimilative capacity. It is for this reason, and in order to bring about additional management and a strong incentive, that the Waste Discharge Charge System is being developed. Discharge users will be obliged to pay, depending on the quantity and quality of their discharge.

Surface water quality is affected by many things including sediment and erosion, the diffuse discharges from irrigated farmland (both fertilisers and salinity through leaching), domestic and urban runoff, industrial waste, and sewage discharges. Of these, industrial waste and sewage discharges are the easiest to licence and control, but this does not mean that this is problem-free. The Department has found that the situation with regard to sewage discharges often far exceeds the standards and conditions demanded by licences. There is a problem of compliance due to unacceptable management practices and overloaded systems with regard to Local Authorities and private operators responsible for waste management systems. Diffuse discharges only

compound the problem by reducing the assimilative capacity until the water becomes unfit for use, very expensive to purify, and a danger to human health.

Groundwater quality requires equal attention, and more so as we recognise the importance of groundwater in supplementing our meagre resources, and providing water to remote communities. Although our groundwater resources are for the most part to be found at a relatively deep level (50-100 m is quite typical) this water can easily be polluted by surface activity. The leaching of fertilisers is one such problem but of greater concern is the influx of nitrates, primarily a consequence of human habitation and sanitation. Pit latrines are on the one hand so necessary, and have the huge advantage of not requiring volumes of water, but disposal is 'on-site', and often responsible for the longer-term pollution of the underlying aquifers which feed and water the communities above.

Water quality is a very important aspect of strategy within this ISP – considered primarily within the Water Quality Strategy and under Groundwater. Industrial wastewater discharge, diffuse agricultural discharges, wastewater treatment works, the location and management of solid waste disposal sites, the siting of new developments, informal settlements and the impacts of sanitation systems, are all elements considered with great concern in this and other ISPs. Despite this attention, it may be that Water Quality has still not taken its rightful place in the integrated management of the water resource. But the Department is moving towards IWRM and the integration of quantity and quality issues. Managers have now been given crosscutting responsibilities that will ensure a far more integrated approach in future.

Actions recommended within the Department include:

1. The need to actively workshop the integration process of resource management, planning and allocations of groundwater and surface water quantity and quality.

2. The review and incorporation of knowledge from recent Water Research Commission studies on both radioactivity and nitrates (groundwater quality issues).

3. A review of all water quality literature reflecting situational knowledge and understanding within this WMA (and each and every WMA).

4. Ensure that water quality monitoring is fully integrated into WMA water resources monitoring.

1.9 GROUNDWATER

The ISP process in all of the Water Management Areas of South Africa has highlighted the role and importance of groundwater as part of the total water resource. Although groundwater has always been important in some areas, this overall vision is a significant advance on our previous understanding of the potential for groundwater use. With the surface water resources in many WMAs now fully utilised, almost the only opportunity left for further development lies in the exploitation of groundwater. More particularly, it is recognised that many of the more remote towns and villages, far from surface supplies, can in fact supply or supplement existing sources through groundwater, and that this must become a priority option. Therefore, too many small communities and subsistence farmers can avail themselves of groundwater when it would otherwise be impossible or impractical to lay on piped supplies. This can also reduce the pressure on existing users and perhaps even circumvent the need for Compulsory Licensing. The Department will be developing its capacity to explore and encourage the use of groundwater.

Of obvious concern is the likelihood of an interaction between groundwater and surface water. If the interaction is strong then additional use of groundwater may simply be reducing the surface water resource already allocated to someone else. In some instances (such as in the case of dolomitic aquifers) this interaction can indeed be very strong, whilst across many areas of the country it is so weak as to be negligible. In these circumstances groundwater comprises a huge pool of available water which is only of benefit if it is utilised. Care must always be taken with the issuing of licences to ensure that both the Groundwater Reserve and other downstream users do not end up being the losers.

The realisation in this and other ISPs is that groundwater offers a huge resource of water which can be tapped, and that this can be a very significant supplement to the national water resource.

1.10 PUBLIC RECREATION – THE USE OF DAMS AND RIVERS

The use of water for recreational purposes is one of the 11 water uses regulated in terms of the NWA (Section 21 j). The Department is developing a national policy towards 'Recreation on Dams and Rivers' and this should, in the first instance, be adhered to. Recreational use can take many forms and only occasionally has any direct impact on the water resource. Most obvious are activities such as power-boating, sailing and swimming which can have quality / pollution impacts. These activities can bring very significant economic benefits to the WMAs concerned, and where water releases can be accommodated, particularly through alignment with the needs of the ecological Reserve or other downstream users, then so much the better.

It is noted in this ISP that water resources offer a very significant recreational outlet and that recreation is an important public and social asset necessary for national health and productivity. A central philosophy is that recreational opportunity should not be unreasonably and unnecessarily denied to users, and that the implementation of policy should ensure that disadvantaged and poor people should also be able to avail themselves of opportunities.

The Department has already transferred responsibility for the management of many public waters to Local Authorities and will continue with this process. Responsibility will therefore devolve upon these Authorities, but within the broad principles as laid down by the Department.

1.11 CO-OPERATIVE GOVERNANCE – THE PLACE OF THE ISP

The ISP is DWAF's approach to the management of water resources within the WMA. This will, in the longer term, be replaced by a consultative Catchment Management Agency. What is most important, in the medium term is that the ISP has a good fit with the Provincial Growth and Development Plan, with regional and other Environmental Management Plans, with plans and expectations of the Departments of Agriculture, Land Affairs, the Environment and others. It must also be aligned with the Integrated Development Plans and Water Services Development Plans now required for each District Municipality. Water is very often a constraining feature in development and co-operative governance planning and implementation is essential in matching what is wanted with what is possible.

1.12 STRUCTURE OF THE REMAINING SECTIONS

The Mzimvubu to Mbashe ISP is divided into two parts. Part 1 of this document provides the overview of the ISP area. It also presents a water balance for each key area of the ISP. The related water resources issues and proposed strategic approach are then described.

The next chapter of this report is Chapter 2: Overview of the Mzimvubu to Mbashe ISP area. This chapter provides the characteristics of the Mzimvubu to Mbashe ISP area. The economic activities and overall water resources perspective is also presented in the chapter.

Chapter 3: Groundwater Resource Overview. In order to raise the profile of groundwater this chapter provides an assessment of the groundwater resources of the Mzimvubu to Mbashe ISP area. It also highlights issues regarding groundwater availability and potential for use of the resource.

Chapter 4: Water Resources Overview – Key Area Perspective. The water resource availability both in terms of quantity and quality is discussed in this chapter. The purpose is to provide an overview of the water user sectors and their existing and future requirements and how they impact on the water resource availability of the ISP area.

Chapters 5 - 8: Key area specific issues and strategies. The reconciliation and the related issues for each key area in the Mzimvubu to Mbashe ISP area are discussed. Each chapter discusses one key area starting with the Mzimvubu key area up to the Mbashe key area. Potential strategic options identified for each issue are also discussed.

Chapter 9: General issues and strategies for the Mzimvubu to Mbashe ISP area. The issues generic to the Mzimvubu to Mbashe ISP area and related strategic options are discussed in this chapter. The proposed management actions required to address the water-related issues and to meet the management goals set, are discussed.

Chapter 10: Implementation strategy. In this chapter the procedures for implementation of the Mzimvubu to Mbashe ISP are discussed.

The second part of this report is Part 2 which provides the detailed strategies for the Mzimvubu to Mbashe ISP area.

There is one Appendix included in the document. Appendix A provides all the relevant data of the Mzimvubu to Mbashe ISP area.

2 CHAPTER 2 : OVERVIEW OF THE MZIMVUBU TO MBASHE ISP AREA

This chapter provides a general overview of the whole of the Mzimvubu to Mbashe ISP area. The key areas in the NWRS have been used for the more detailed situation assessment. This detailed information is provided for each key area separately in Chapters 5 to 8.

2.1 LOCATION AND DESCRIPTION OF THE ISP AREA

The Mzimvubu to Mbashe ISP area forms a major part of the Mzimvubu to Keiskamma Water Management Area (WMA 12). The area is bounded in the west by the Kei River catchment, in the east by the Mvoti to Mzimkulu WMA, in the north west by the Upper Orange WMA and in the north by Lesotho. Although the ISP area shares an international boundary with Lesotho, there are no shared watercourses between them (DWAF: 1999) [(12)]. The locality map of the Mzimvubu to Mbashe ISP area is provided in Figure 2.1. The ISP for the Amatole –Kei catchments which is part of WMA 12 is available separately.

The Mzimvubu to Mbashe ISP area has been divided into four key areas for reporting purposes, the Mbashe, Mtata, Mzimvubu and Pondoland key areas (often referred to as the Wild Coast) (see Figure 2.2). For the sake of consistency, these areas were chosen to be the same as those used in the NWRS and are referred to as key areas.

The descriptions of these key areas are as follows:

- The Mzimvubu key area corresponds with the Mzimvubu River catchment. The Mzimvubu River key area comprises the T30 secondary catchment.
- Pondoland key area comprises the T60 secondary catchment and includes all the coastal rivers east of the Mzimvubu catchment. This key area is known in the NWRS as the Wild Coast. However the Wild Coast runs from the Kei River mouth to the Mzimvubu River mouth. In order to avoid confusion the ISP has used the name Pondoland for the key area instead of the Wild Coast. The T40 and T50 secondary catchments, which make up the rest of the primary catchment, fall in the Mvoti to Mzimkulu WMA.
- The Mtata key area comprises the Mtata River Catchment and the coastal rivers between the Mbashe and the Mzimvubu rivers. The Mtata River key area comprises only the T20, T70 and T80 secondary catchments.
- The Mbashe key area includes the secondary catchments of the Mbashe and coastal areas between the Mbashe and Kei rivers. The Mbashe River key area comprises the T10 and T90 secondary catchments.

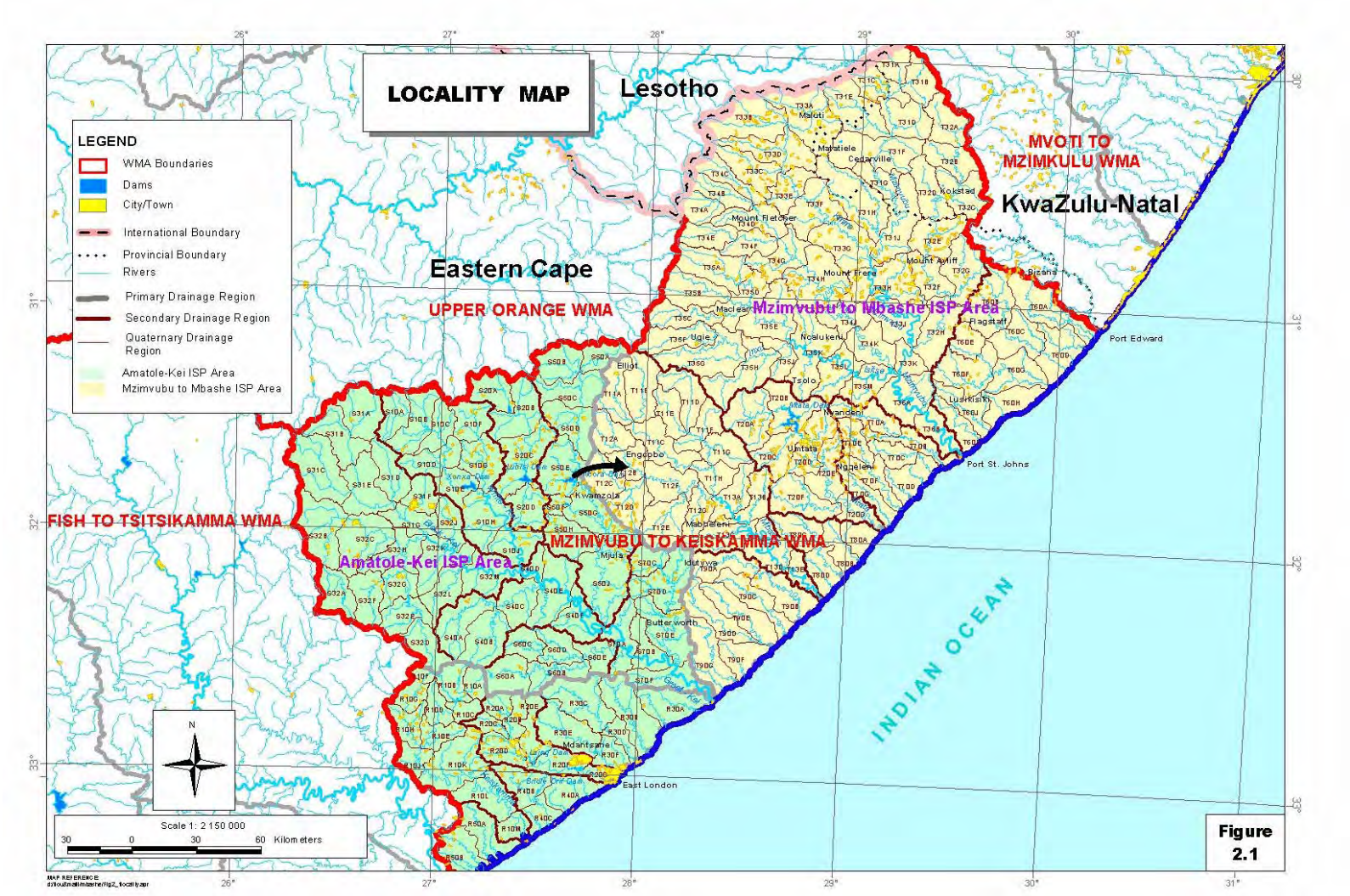


Figure 2.1: Mzimvubu to Mbashe ISP area in relation to the Mzimvubu to Keiskamma WMA

2.2 PHYSICAL CHARACTERISTICS

2.2.1 Topography and Rivers

The topography of the Mzimvubu to Mbashe ISP area is shown in Figure 2.2. The Mzimvubu River is by far the largest river in the ISP area and has a catchment area of 19 852 km^2. The Mzimvubu and its four main tributaries, the Tsitsa, Tina, Mzintlava and Kinira Rivers, have their headwaters in the Drakensberg Mountains along the border with Lesotho. The main Mzimvubu River flows through deep gorges across the coastal plain before discharging into the Indian Ocean at Port St Johns. The Mzimvubu River is the largest undeveloped river in South Africa.

The Pondoland key area (T60) which rises in the coastal strip between the Mzimvubu River Basin and the north-eastern boundary of the Mzimvubu to Keiskamma WMA, has rivers and estuaries of high conservation value (DWAF: 2004) [25]. The Pondoland key area includes the Mkambati Nature Reserve, a highly sensitive ecological area.

The Mtata River rises in the foothills of the Drakensberg Mountains at an altitude of about 1 600 m amsl and flows through the rugged topography of the 60 km wide coastal strip to the sea.

There are several small coastal catchments (T70, T80, T90) situated between the catchments of the main rivers and the coast. The Mngazi, Xura and Xinira rivers have unspoiled estuaries with high conservation status.

The Mbashe River has its headwaters in the mountains of the southern Drakensberg at an altitude of about 2 300 m amsl, and flows across the plateau in the central portion of the catchment before entering deeply incised valleys and discharging into the Indian Ocean (see Figure 2.2).

2.2.2 Geology and soils of the catchments

The predominant strata in the Mzimvubu to Mbashe ISP area consist of shales, mudstones and sandstones of the Karoo Sequence with some localised intrusions of dolerite dykes and sills. Basaltic lavas of the Drakensberg Formation occur in the upper parts of the Mzimvubu catchment (T33B, T34A to T34C, T34E and T35A) and small patches of Dwyka Tillite occurs in the lower part of the Mzimvubu catchment (T36B) and the central portion of the Pondoland key area (T60A, T60C, T60G, T60J and T60K). Sandstones outcrop locally along the Pondoland coast (T60).These dominant strata have limited water bearing capacity. Figure 2.3 provides the geology of the Mzimvubu to Mbashe ISP area.

As a result of the predominant geological strata as well as the climate, the soils of the ISP area can be categorised into four main groups:

- Moderately deep to deep clay soils on the steep slopes of the Drakensberg along the Lesotho border;
- Moderately deep to deep clayey loams on the steep slopes of the foothills of the Drakensberg;
- Moderately deep to deep clayey loams in undulating to steep terrain along the majority of the coast of the Mbashe and Mtata key areas; and
- Moderately deep to deep sandy loams in undulating terrain in the remainder of the ISP area.

Figure 2.4 presents the soils map of the Mzimvubu to Mbashe ISP area. It is important to note that most of these soils are prone to erosion due to their naturally dispersive nature. Overgrazing exacerbates the erosion problems in most parts of the former Transkei area.

Little information exists regarding soil potential for large parts of the Mbashe, Mtata and upper parts of the Mzimvubu River catchments. Where the information exists, it is evident that most of the soils are either poorly or completely unsuited for arable agriculture but suited for grazing and forestry. There is significant commercial forestry in the Mzimvubu and Mtata River catchments. Only small areas suitable for arable agriculture are to be found in the study area.

Figure 2.2: Topography map of the Mzimvubu to Mbashe ISP area

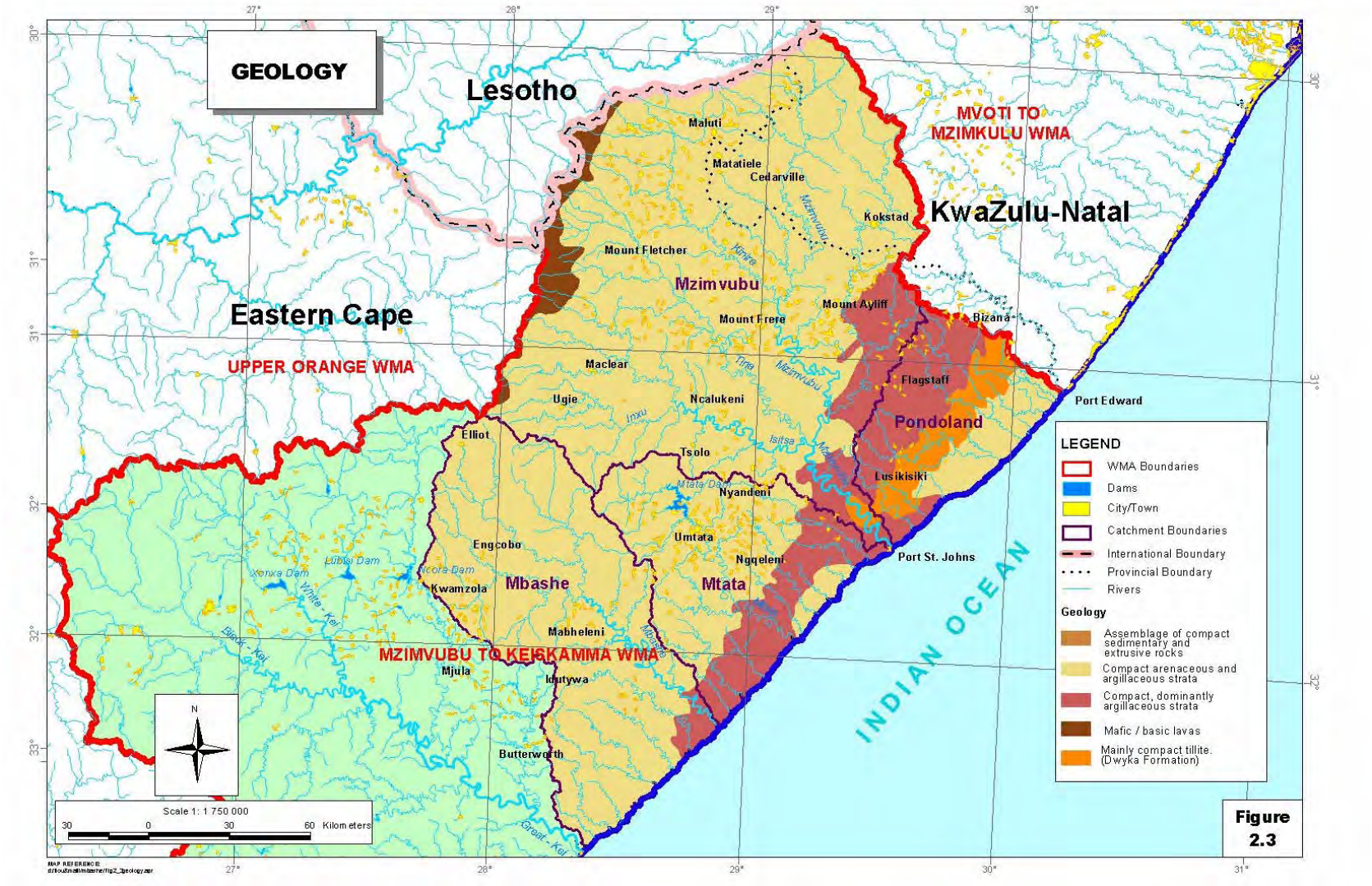


Figure 2.3: Geology map of the Mzimvubu to Mbashe ISP area

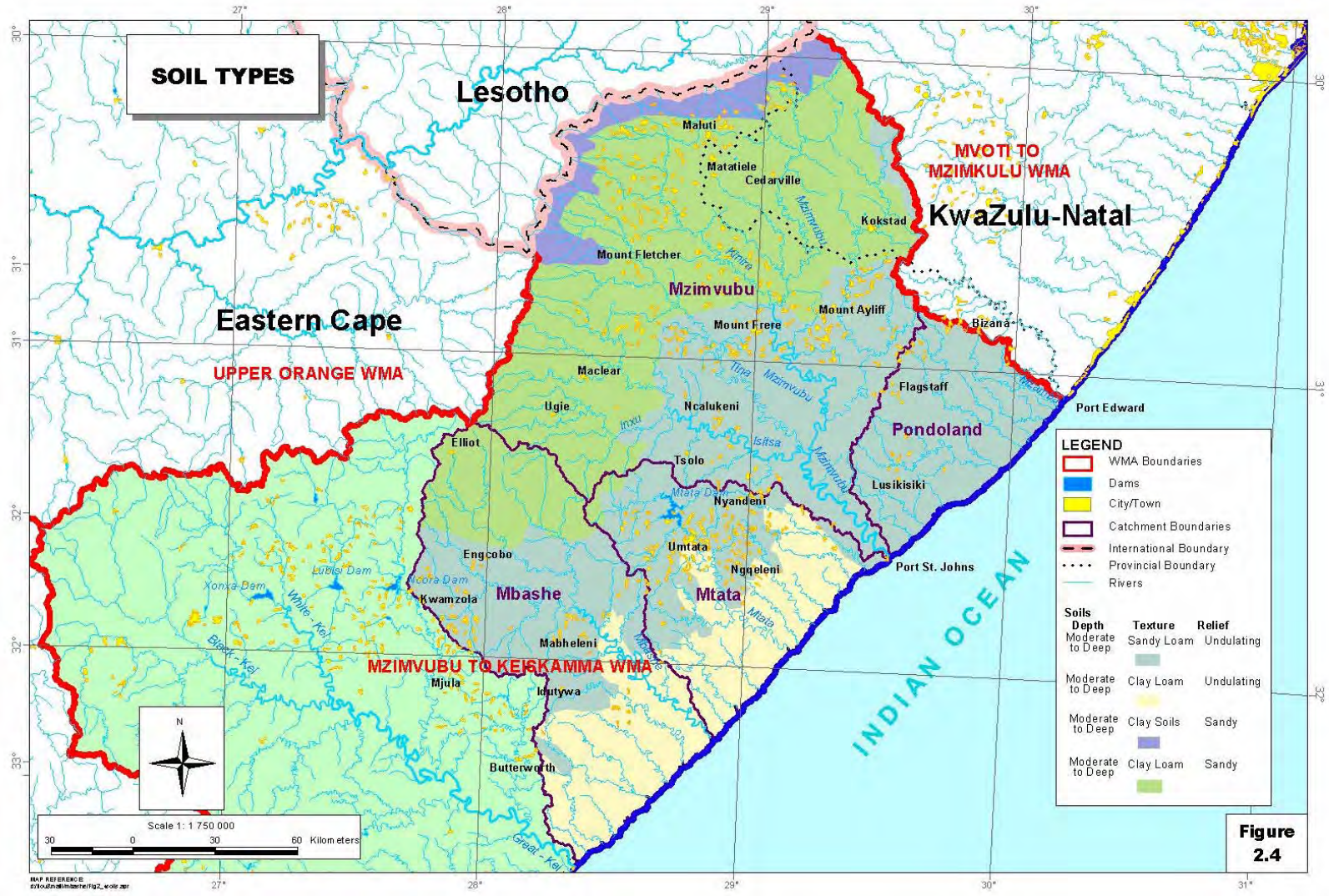


Figure 2.4: Soils map of the Mzimvubu to Mbashe ISP area

2.2.3 Climate and rainfall

The climate and temperature variations of the Mzimvubu to Mbashe ISP area are closely related to elevation and proximity to the coast. The study area experiences a mild, temperate climate along the coast to more extreme conditions inland with most rainfall occurring during the summer months (DWAF: 1999) [12]. Temperature variations along the coast are less pronounced than inland where frost (and sometimes snow) is regularly experienced during the winter months, while temperatures could exceed 40^0C in summer.

Figure 2.5 provides a precipitation map. Annual rainfall is highest in the coastal regions in the Pondoland key area where it ranges between 1000 mm and 1500 mm. The mean annual precipitation in the Mzimvubu key area ranges from between 600 mm to 800 mm in the upper areas of Matatiele and Maluti, which are situated in the foothills of the Drakensberg Mountains. Mean precipitation for the rest of the Mzimvubu key area decreases from the coast towards the inland and ranges between 1000 mm and 800 mm. There are local high rainfall areas in the headwaters of the Mtata River and the upper parts of the Mbashe key area (see Figure 2.5).

2.2.4 Vegetation

The vegetation varies from lush coastal forests to sparse grassland with savannah grassland being the dominant vegetation type in most parts of the study area. Patches of thicket and bushland occur in the lower parts of all the key areas. Indigenous forests are found mainly in the coastal areas. Small patches of indigeneous forest are also found in the upper parts of the Mtata key area. The majority of commercial afforestation (mainly pinus species) lies in the upper reaches of the Mbashe and Mtata key areas and the western parts of the Mzimvubu key area (T35) (see Figure 2.6).

2.2.5 Land use

Most of the land-use activity in the former Transkei area is based on subsistence and livestock farming. A very large area of the upper and central parts of the former Transkei can be classified as degraded, mainly as a result of overgrazing, resulting in severe erosion (see Figure 2.6).

The land use of the study area (see Figure 2.7) can be subdivided into the following:

- Subsistence farming in the former Transkei is mainly for maize, vegetables and cattle farming.
- Commercial agriculture, mainly livestock farming taking place in the upper parts of the Mbashe key area around Elliot, the western parts of the Mzimvubu key area around Ugie and Maclear and in the whole of the Mzimvubu key area that is part of the KwaZulu - Natal Province. There is significant commercial livestock farming in the Matatiele, Kokstad and Maluti areas of the Mzimvubu key areas.
- Commercial forestry is taking place in the upper catchments of the Mtata key area above the Mtata Dam, the Mzimvubu key area and the Mbashe key area.

A significant number of wetland areas occur in the northern parts of the Mzimvubu key area (T31 and T33).

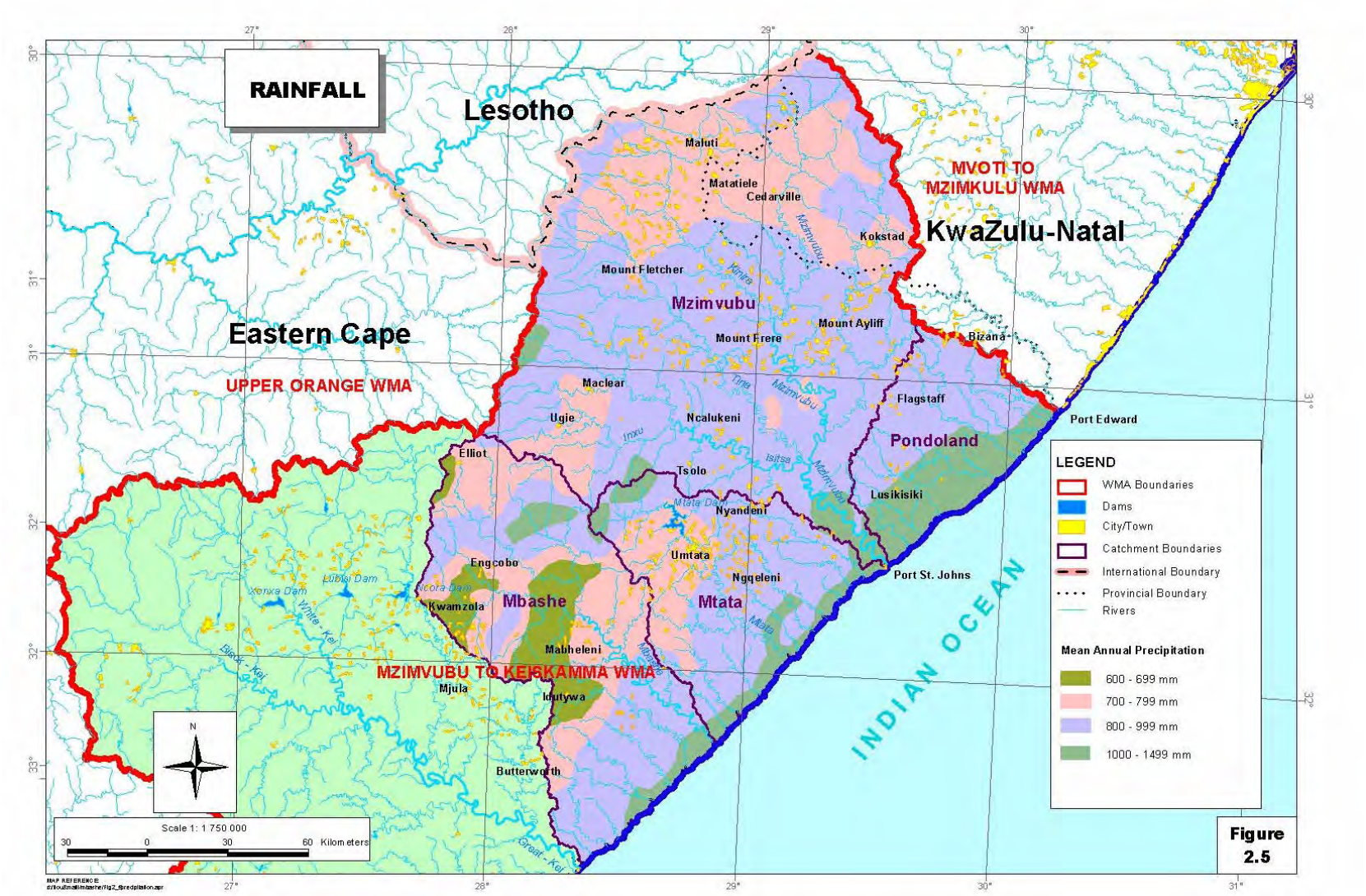


Figure 2.5: Precipitation map of the Mzimvubu to Mbashe ISP area

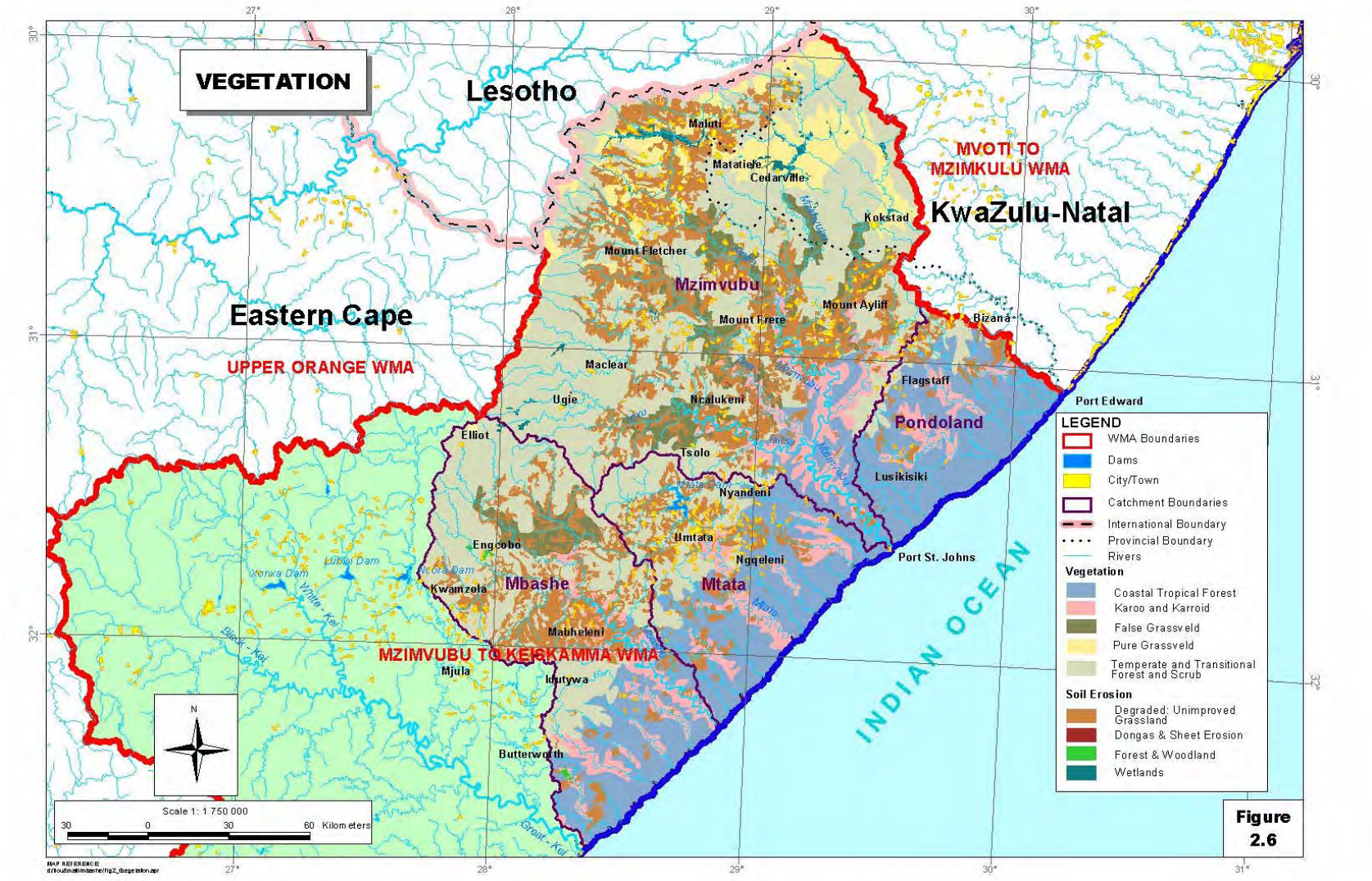


Figure 2.6: Vegetation map

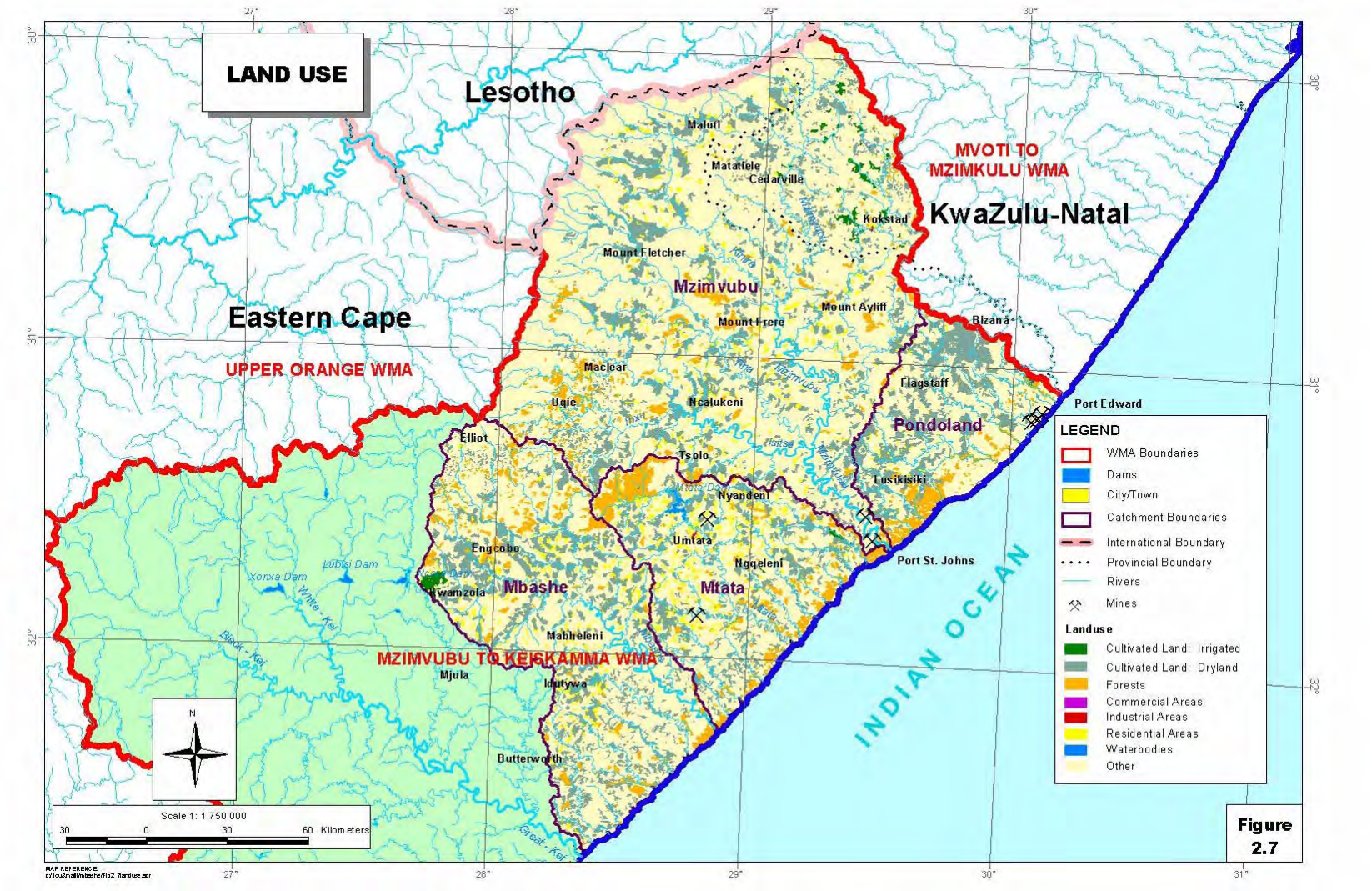


Figure 2.7: Land use map of the Mzimvubu to Mbashe ISP area

2.3 DEMOGRAPHY

According to the demographic study conducted for DWAF in 2001 (MarkData, 2002) [23], the total population of the Mzimvubu to Mbashe ISP area in 1995 was estimated at 2,69 million. The majority of the population of the area (2,34 million) is situated in rural areas. The urban population is situated mainly in the Mzimvibu (i.e. Kokstad, Matatiele and Port St Johns) and the Mtata (i.e. Mtata) key areas. A number of smaller semi-rural towns are also scattered across the study area. Most of the population lives in small rural villages scattered over the countryside.

The future demography of the ISP area will largely be influenced by economic opportunities and potential as well as the general trend towards urbanisation. With this in mind, the population is expected to show a slow decline after 2005 to approximately 2,48 million by the year 2025. This is attributed to a combination of factors including the lack of strong economic stimulants together with the impacts of HIV/AIDS and migration towards the cities. It is not expected that the profile for classification of the majority of the population will change much in the near future.

2.4 CATCHMENT ECONOMY AND ITS INFLUENCE ON WATER RESOURCES

2.4.1 Economic sectors contributing to the Gross Geographic Product (GGP)

The main economic activities in the Mzimvubu to Mbashe ISP area are subsistence agriculture, tourism and commercial forestry activities (DWAF, 2003) [22]. The government sector also contributes a large share of the GGP in 1996 because of the presence of government services in Mtata, the main urban centre of the study area. It has been noted that with Bisho now being the capital of the Eastern Cape and being situated in the Amatole-Kei ISP area, there has been a significant decline in the GGP contribution of the Mzimvubu to Mbashe study area and an increase in the Amatola-Kei ISP area.

Subsistence sheep and cattle farming is practised extensively throughout the ISP area but particularly in the former Transkei and Ciskei area of the catchments (see Figure 2.9). Commercial farming occurs in the former RSA areas such as Ugie, Maclear, Kokstad and Matatiele where irrigation of pasture for dairy farming takes place. These are the areas where agriculture contributes to the GGP of the WMA.

Commercial forestry contributes significantly to the GGP and employment of the Mzimvubu to Mbashe ISP area. Extensive commercial forestry occurs in the upper parts of the Mbashe, Mtata and Mzimvubu key areas. In addition to the Langeni sawmill situated above the town of Mtata, there are small-scale sawmills in the Mtata key area which also contribute to employment creation. There is potential for expansion of areas under forestry because of the ideal rainfall and climatic conditions, particularly in the Mzimvubu and the Pondoland key areas; where 60 000 – 80 000 ha is probably suitable for forestry and 40 000 ha is considered a reasonable target.

2.4.2 Employment

The Mzimvubu to Mbashe ISP area is one of the poorest areas in the country. The majority of the people in this ISP area (nearly 91%) live in rural areas where their incomes are directly linked to the agricultural sector, which is mainly subsistence (EC Province, 2003) [13]. The levels of education and training in the rural areas are low. Approximately 49% of the people are unemployed. There is a widening poverty gap between the western portion of the WMA and this ISP area due to the unfavourable conditions of the Mzimvubu to Mbashe ISP area as summarised below:

- The distance from markets due to the poor road and railway infrastructure and the lack of good port facilities has hampered development of industries in the ISP area
- The ISP area has a largely rural and unskilled labour force, which has contributed to unemployment.

2.5 LAND-TENURE SYSTEM

Land tenure in the area is characterised by the different systems found in the former South Africa and the former Transkei (see Figure 2.9). Within what was previously Transkei there are five categories of land tenure:

- Tribal land sometimes coupled with the quitrent system and permits to occupy (PTO). This constitutes over 80% of the area
- Freehold land
- State land
- Municipal land
- Institutional land (churches etc).

Within what was the “South African” portion of the area, either individuals or farming syndicates hold the majority of land under freehold title. The remaining areas are state, municipal and institutional lands.

Problems associated with the tribal land tenure system include overgrazing of communal lands. Very little progress has been made to date to change the tenure system to improve land-use practices.

2.6 INSTITUTIONAL ARRANGEMENTS FOR WATER RESOURCE MANAGEMENT

The NWA provides for the establishment of statutory bodies in order to decentralise management of the water resource to ensure sustainability, equity and beneficial use of water resources in the WMAs. Figure 2.8 shows the roles and responsibility of the institutions involved in water resource management.

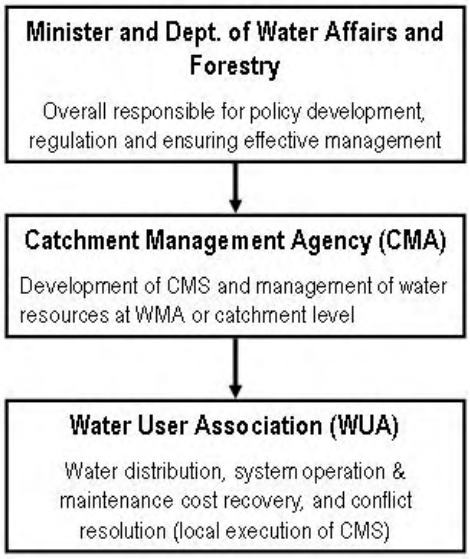


Figure 2.8: Institutional arrangement in the context of Integrated Water Resource Management (IWRM)

The local authorities, although not directly involved in water resource management, are key institutions in water service provision at acceptable levels of service to the communities they serve. Figure 2.10 shows the 18 local municipalities that are in the Mzimvubu to Mbashe ISP area. The following District Municipalities are situated in the Mzimvubu to Mbashe ISP area:

- Sisonke District Municipality: This DM straddles the border with the KwaZulu-Natal Province. There are two local municipalities which are designated Water Services Authorities (WSAs), Greater Kokstad and Matatiele Local Municipality.
- Alfred Nzo District Municipality: This DM is the responsible WSA for the rural areas situated in the upper catchments of the Mzimvubu key area.
- OR Tambo District Municipality: This DM covers the major portion of the ISP area and includes the towns of Mtata, Port St Johns, etc.
- Ukhahlamba District Municipality: This DM traverses both the Mzimvubu-Keiskamma WMA and the Upper Orange WMA.
- Chris Hani District Municipality: This DM is situated in the upper Mbashe key area and extends into the Kei catchment.
- Umzantsi District Municipality: This DM is stituated in the lower Mbashe key area and extends into the Kei catchment.

As can be seen from Figure 2.10, it is a very important point to note that the ISP area traverses the provincial boundary of KwaZulu-Natal. The Ukhahlamba DM also traverses two WMAs. This complexity indicates the importance of co-operative governance for the Mzimvubu to Mbashe ISP area. This is discussed in the general strategies of the ISP area.

2.7 WATER RESOURCES OVERVIEW

The Mzimvubu to Mbashe ISP area is one of the areas with the highest mean annual runoff in the country. About 40% of the total surface runoff from the WMA is from the Mzimvubu River catchment. The extent of water resources development in the water management area varies considerably. No noteworthy dams have been constructed in the Mzimvubu River catchment, where significant potential for water resource development remains, as also applies to the Mbashe River. The Mtata River is well regulated by the Mtata Dam. Three small hydro-electric developments exist in the water management area, one on the Mbashe River and two on the Mtata River. An inter-basin water transfer occurs between the Kei and the Mbashe catchments. There are no inter-water management area transfers.

Overall, the available groundwater resources within the catchment are under-utilised, although this clearly depends both on the groundwater occurrence and the demand. The underutilisation of groundwater is attributed to the fact that in the past most groundwater schemes failed for various reasons. The main reason for the failure has been lack of proper maintenance and institutional capacity problems of the local authorities. Local communities are unable or unwilling to accept responsibility for maintenance or have inadequate local authority support. Groundwater is ideal for smaller communities which are prevalent in the ISP area. Even limited groundwater occurrence areas can often provide more than the RDP level of 25 litres per person per day. Groundwater can be the main source for rural water supplies because it is affordable and, if managed properly, can be sustainable.

There is potential for groundwater to contribute to poverty eradication by developing community gardens in this predominantly rural area. This is discussed in more detail in Chapter 3. Chapter 3 and Chapter 4 describe in more detail the groundwater and surface water respectively. The level of detail discussed in these chapters is appropriate for input into the NWRS and consequently has been used to compare the aggregated totals of the ISP key areas with the NWRS. The detailed analysis of the ISP key areas can be found in chapters 5 to 8.

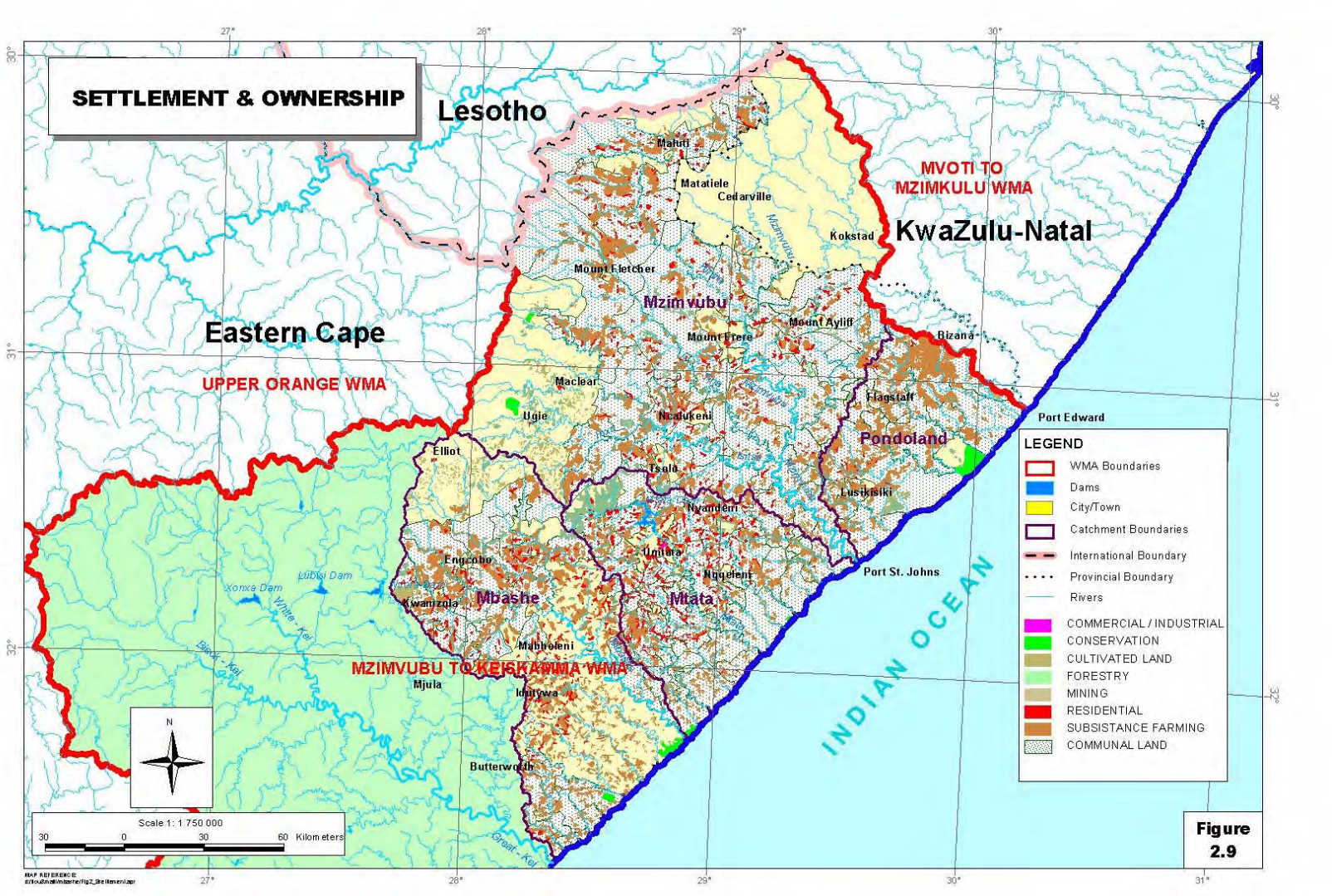


Figure 2.9: Land ownership in the Mzimvubu to Mbashe ISP area

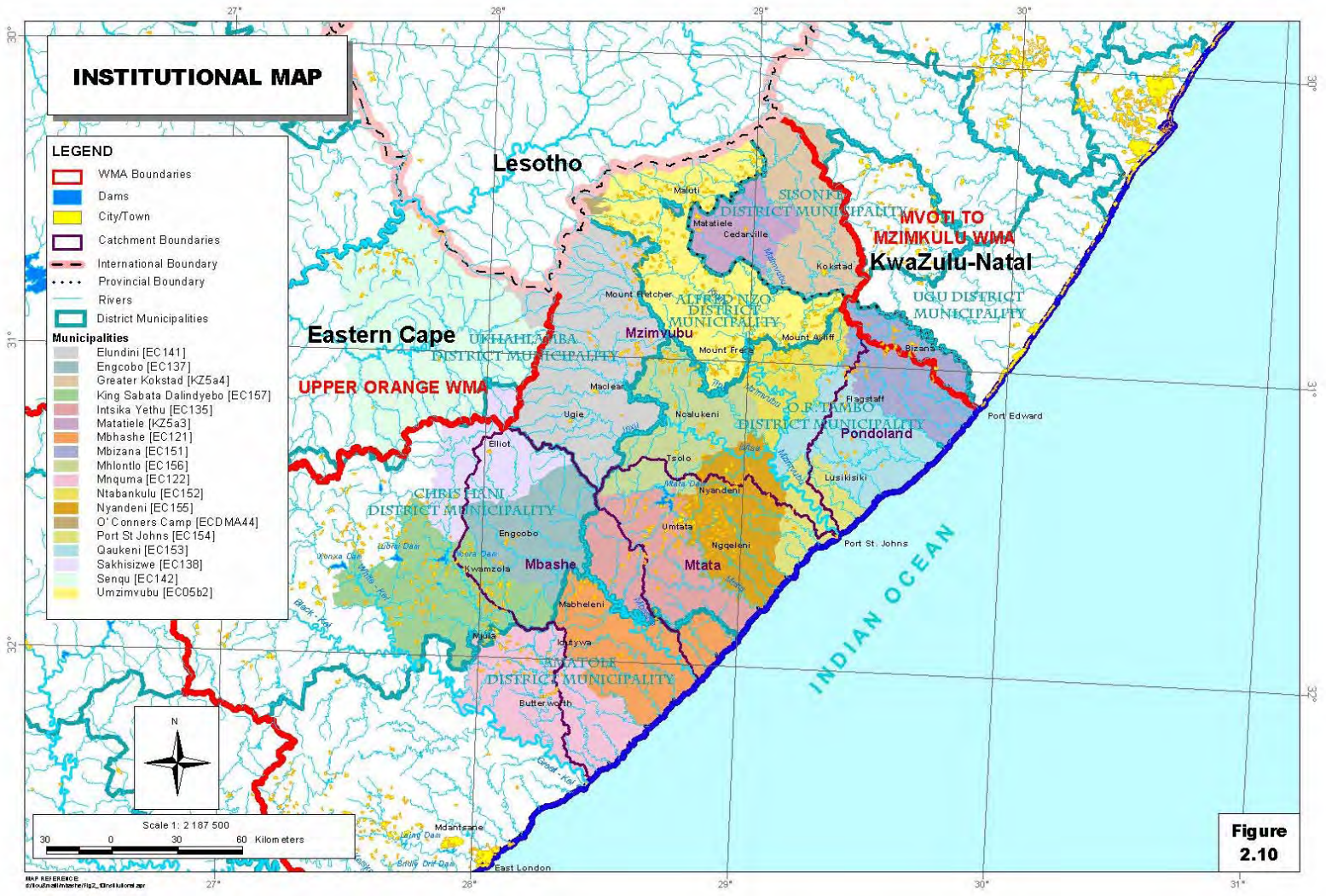


Figure 2.10: Institutions in the Mzimvubu to Mbashe ISP area

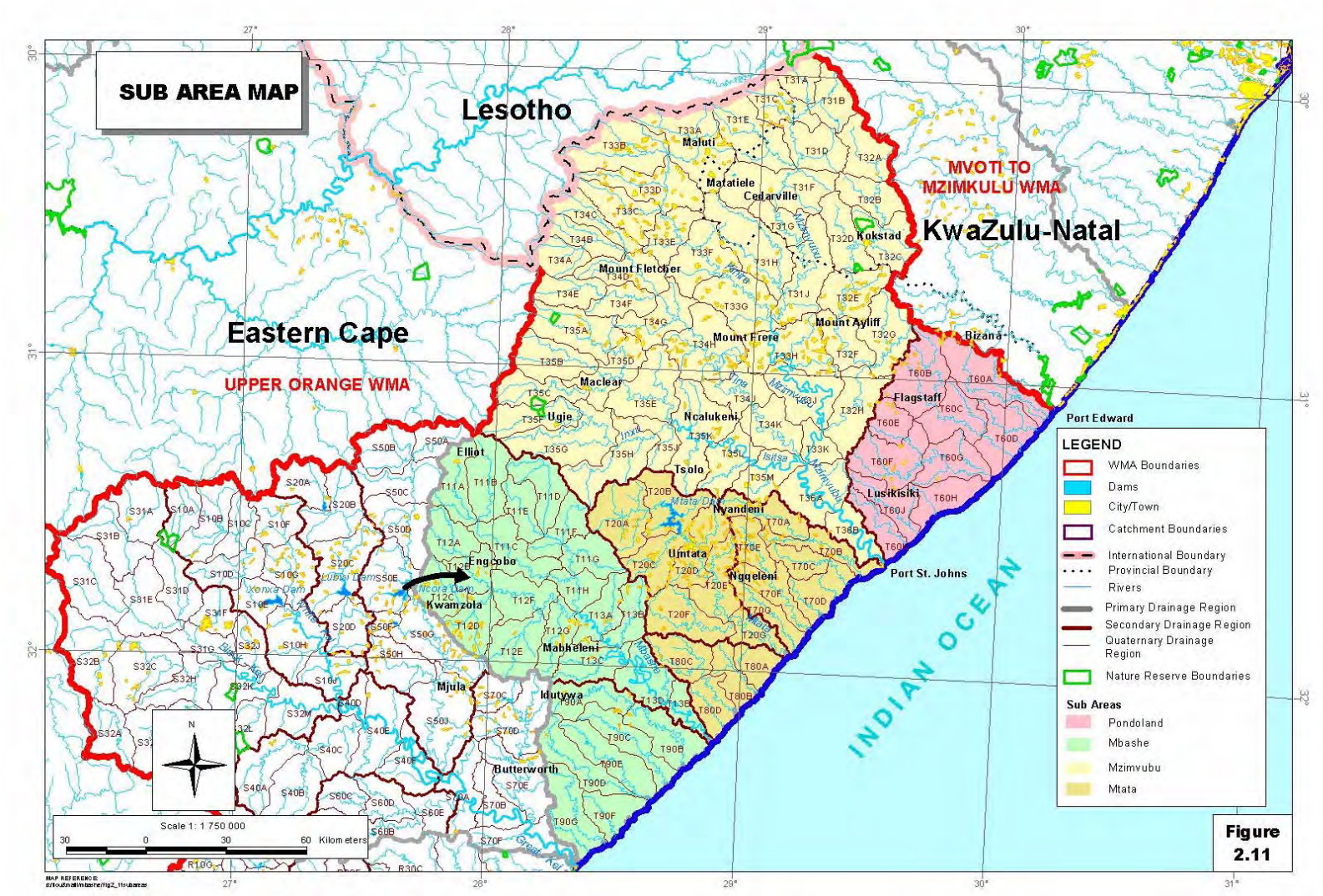


Figure 2.11:Key area maps of the Mzimvubu to Mbashe ISP area

3 GROUNDWATER RESOURCES OVERVIEW

3.1 HYDROGEOLOGY

The geology of the Mzimvubu to Mbashe ISP area is dominated by the Mapumulo Metamorphic complex and associated igneous intrusives, such as

- The Msikaba Formation, Ecca Group and lower Beaufort Group found on the coastal plateau
- The Molteno and Elliot Formations and Drakensberg Formation, including the upper Beaufort Group, found inland.

The major portion of the Mzimvubu to Keiskamma WMA is underlain by shallow intergranular and fractured aquifer systems which include the following:

- The Msikaba sandstone Formation in the T60A, D, G, and H quaternary catchments. This formation gives good borehole yields and the high rainfall in the coastal plains of Pondoland ensures good aquifer recharge and yields.
- The Katberg sandstones, which extend from the Kei River to Mtata. Boreholes in these sandstones also have reasonably good yields, but the lower rainfall reduces the recharge and aquifer yields.
- The Clarens sandstones which form the foothills of the Drakensberg Mountains in the north-western and northern parts of the ISP area.

These aquifers are shown in Figure 3.1.

The springs in the Mzimvubu to Mbashe ISP area, are mostly confined to the upper Mbashe (T11 and T12) and western Mzimvubu (T35) catchments. However, there are some other springs in the lower catchments, such as the Sinuka Spring near Port St Johns.

3.2 GROUNDWATER USE

The National Groundwater Data Base (NGDB) indicates that there is a concentration of boreholes in the Matatiele – Kokstad district. Groundwater abstraction is from shallow alluvial aquifers. There is also extensive groundwater usage along the Katberg sandstone axis south west of Mtata. The rest of the borehole distribution pattern in the area does not seem to reflect the underlying geology.

A number of towns depend fully or partly upon groundwater supply. The town supply is summarized in Table 3.1. The total current groundwater usage is estimated at approximately 1.65 million m^3/a, based on the available information. However there are major gaps in the information. There is no information for Tsolo (T35K) and Tabankulu (T33H/T32F) although it is known that these towns are dependent on groundwater. Libode (T70 E) was previously supplied by boreholes, but is now supplied from the Umhlanga Scheme. One borehole remains active as a back-up source. Kokstad (T32D/C) relies on the Crystal Spring for a portion of its supply. Based on the information collated from the DWAF database, the total estimated groundwater use could be as much as 6.2 million m^3/a.

There are uncertainties in the estimated yields of the existing boreholes because of the following:

- ❑ The properties of the aquifers from which water is drawn are unknown.
- ❑ Depths, diameters and construction details of the boreholes supplying the towns are not available.
- ❑ Records of what the boreholes and wells have yielded are not available.

Table 3.1: Main towns dependent on groundwater supply

Quats	Scheme Name	Groundwater Details	Population Supplied	Scheme Capacity		
				Million m^3/a	Unit consumption l/c/d	Limiting Factor
Amatole District Municipality						
T90C	Willowvale/Gatyana	5 boreholes	10 146	0.15	40	Source
T90G	Kentani	13 boreholes	800	0.05	170	Source
T90G	Ncerana	2 boreholes	1 350	0.07	151	Source
T90G	Ngicizele	4 boreholes	3 785	0.13	100	Source
Total			16 081	0.4		
OR Tambo District Municipality						
T32H	Flagstaff	4 boreholes and small dam	5 300	0.18	94	Treatment Capacity
T70F	Godini	Boreholes	2 500			
T20D	Lower Gungululu	Protected springs	Unknown			
T70C	Cwele	Boreholes				
T35K	Qumbu Town	9 boreholes	2 000	0.04	60	Source
T20D	Emtebe	Borehole and spring	8 700			
Total			18 500	0.22		
Chris Hani District Municipality						
T12B	Engcobo Town	Boreholes and 2 streams	11 000	0.21	52	Source
T12A	Mtangana	Springs, boreholes & Mtangana Dam	16 000	0.14	24	Source
Total			27 000	0.35		

Ukhahlamba District Municipality						
T34B	Mt Fletcher	Boreholes	11 500	0.05	12	Source
T33H	Mnceba	Protected springs, boreholes & weir	29 000	0.63	60	Source
Total			40 500	0.68		

3.3 GROUNDWATER RESOURCE AVAILABILITY

An estimate of the yield potential of the aquifers in the Mzimvubu to Mbashe ISP area was conducted based on the long-term average recharge from rainfall. It was assumed that the storage capacity of the aquifers is large enough to even out year-to-year variations in recharge. Table 3.2 presents the estimated groundwater exploitation potential, the present use and the remaining potential that can still be developed in each of the ISP key areas.

Table 3.2: Estimate groundwater availability per ISP key area (million m^3/a)

ISP key area	Recharge capacity			Potential groundwater yield (50% of Recharge less Baseflow)	Current groundwater use	Unexploited potential still available
	Recharge	Baseflow	Recharge less Baseflow			
Mzimvubu	1009	496	513	256	1.3	255
Pondoland	260	186	74	37	0.9	36
Mtata	310	193	117	58	2.7/1.5	55
Mbashe	440	217	223	111	1.4	110
TOTAL	2019	1092	927	462	6.2	456

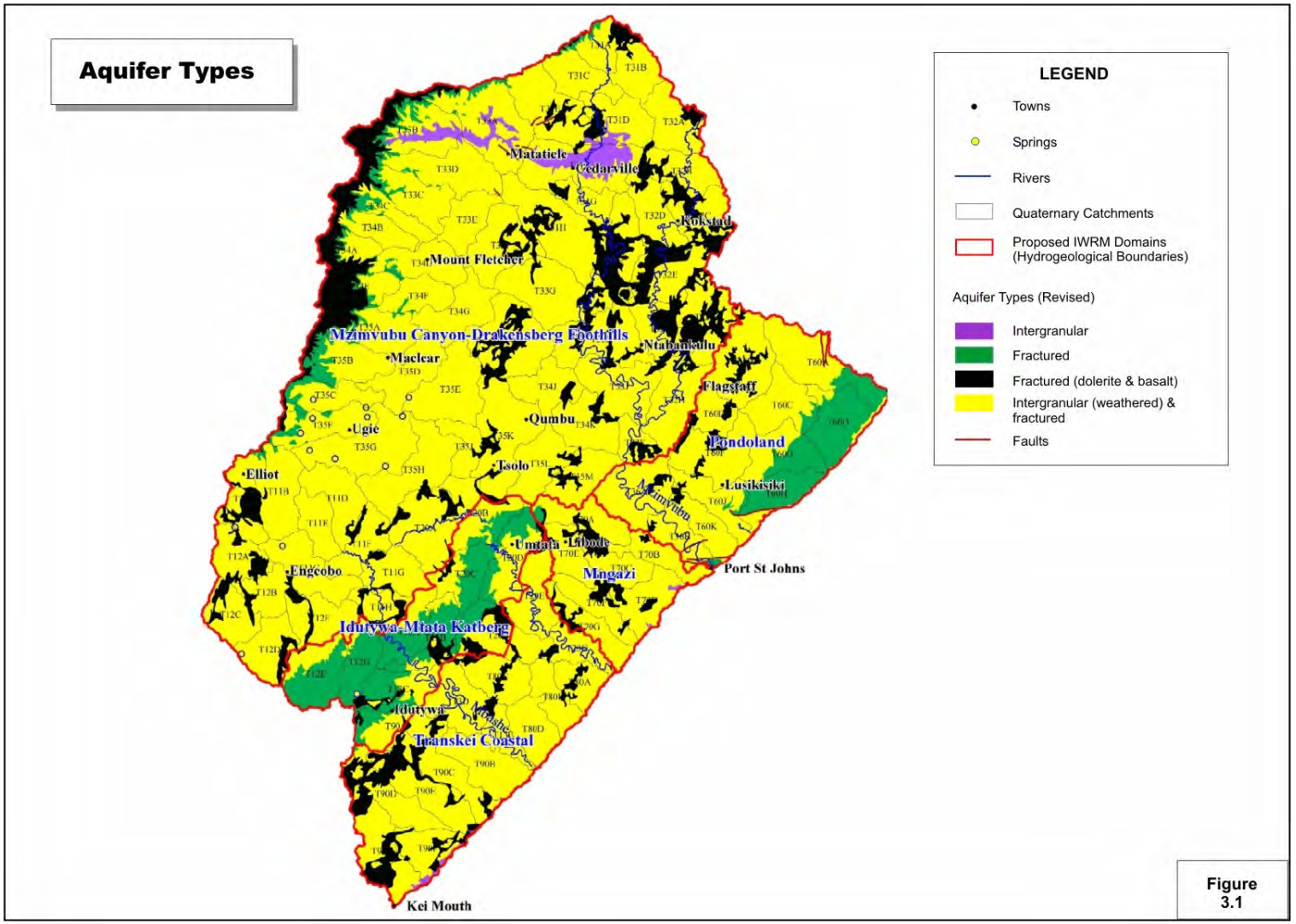


Figure 3.1: Aquifer Types

Table 3.2 indicates that there are still significant amounts of unexploited groundwater in all the ISP key areas. What is more significant is that the available surface water resources in the Pondoland key area under current development are limited, while there are indications from the above table that there is scope for groundwater development to meet the growing domestic water requirements in that key area. A feasibility study by the Directorate: Options Analysis is at present being undertaken for Lusikisiki and surrounding villages to determine the preferred development option between groundwater and surface water.

In the other key areas, although there is enough surface water resources available to meet any growth in water requirements, a large number of the rural towns are dependent on groundwater. There are substantial advantages to groundwater use. The quality of the groundwater in the ISP area is good and borehole water requires no treatment. There is however potential for groundwater pollution.

Boreholes should be well sited and there should be proper monitoring of the groundwater. The borehole success rate may increase the cost of supplying domestic water supply from groundwater. Therefore, there is a need for conducting detailed hydrogeological surveys to determine the groundwater potential and estimated cost of development, which should be compared with the cost of supplying water from surface sources.

3.4 GROUNDWATER STRATEGIC PERSPECTIVE

Groundwater is of major importance to rural development in the Mzimvubu to Mbashe ISP area, and more specifically in the Pondoland key area in meeting an array of basic needs from public health, livestock watering, poverty alleviation and economic development. The challenge for DWAF is to raise awareness of the linkages between groundwater and rural development and to assist the WSAs to identify appropriate approaches for the use of groundwater, from improving the operational reliability of groundwater to the sustainability of groundwater resources as a whole. This requires management of social, functional and skills changes.

In the north-eastern portion of the ISP area, that is the Matatiele and Kokstad area, there is extensive use of groundwater while the area also has wetlands. An important factor is to manage groundwater abstraction in order to maintain groundwater levels in and discharges to the groundwater-fed wetlands because of the ecological importance of these wetlands.

For groundwater use to be regarded as sustainable there is a need to improve the understanding of groundwater recharge and the aquifer recharge mechanisms, even in the absence of adequate field data.

The primary objective is to empower the Eastern Cape Regional Office with the knowledge, information, manpower, hardware and software to monitor and regulate groundwater usage in accordance with the National Water Act (NWA) (1998), the Environmental Conservation Act (ECA) (1989) and the National Environmental Management Act (NEMA) (1997).

A secondary objective is to create awareness by district municipalities of the advantages of groundwater use. The cycle of cause and effect with regard to issues of health, operations and maintenance, as well as project and contract processes, must be addressed.

The detailed strategy on groundwater availability and use is described in Strategy No 1.5.

3.5 GROUNDWATER QUALITY

Figure 3.2 illustrates the groundwater aquifer vulnerability of the ISP area, indicating the extent to which the aquifers can be adversely affected by an imposed contaminant load. The least vulnerability indicates aquifers only vulnerable to the most persistent pollutants in the very long term. The moderate vulnerability of most of the aquifers in the ISP area illustrates vulnerability to many pollutants, except those highly absorbable and/or readily transformed.

The groundwater over most of the ISP area is generally of very good quality. However, the groundwater quality of the Katberg area near Idutywa has total dissolved solids (TDS) in the range 70-300 mg/l, and the TDS reaches over 300 mg/l where the Katberg wedges out closer to Mtata. The reason for this is because of the pollution of the groundwater from the recharge zone of the Mtata River. This in turn is due to pollution from overflow of sewage from the treatment works in Mtata town into the nearby Mtata River. There is a need to address this problem. Although the quality of the groundwater in the Pondoland ISP key area is still of good quality there is increasing potential of contamination from the sewage works in the area eventhough the aquifer vulnerability is low.

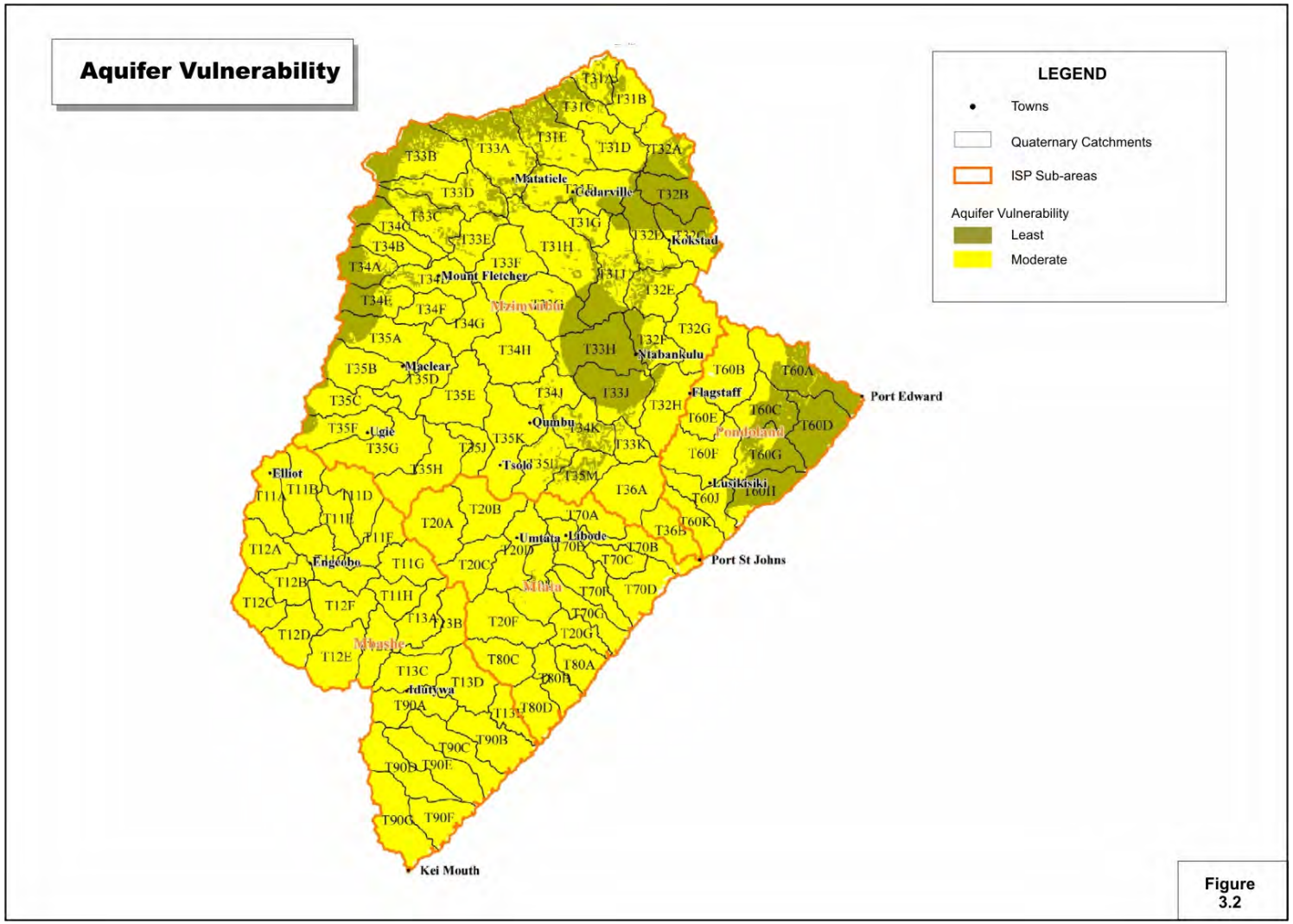


Figure 3.2: Aquifer vulnerability

4 SURFACE WATER RESOURCES OVERVIEW

4.1 INTRODUCTION

This chapter documents the details of the water resources, water requirements and water quality of the catchment as obtained through this ISP process. These are broadly the same as those of the NWRS, but where deviations from the NWRS are recommended, these are carefully motivated in each chapter describing the specific ISP key area. This updated information will be incorporated into future updates of the NWRS. A reconciliation of the available water with the water requirements for the current level of development and future expected developments was conducted. From this, the key issues were identified and broad strategies developed to address these issues. Detailed strategies are attached in Part 2 of this report.

4.2 MANAGEMENT OBJECTIVES

There are a number of generic objectives relating to the management of the water resources of the Mzimvubu to Mbashe catchments. These are:

- Effective and sustainable use and management of the water resources in the catchment, which recognises the Reserve and the value of water as an asset for economic and socio-economic benefit.
- Equitable allocation of the surplus allocable water resources to encourage the development of the rural economy in order to contribute to poverty eradication.
- To make more efficient use of the existing available water resources by all water user sectors. This will enable the DWAF in the interim and the CMA in future, to free up additional water, which can be put to beneficial use.
- Achieving water quality that is fit for its intended purpose, with the negative externalities being borne by the responsible institutions (polluter-pays principle) and maintaining aquatic ecosystem health on a sustainable basis.
- To ensure availability of reliable data and information on all aspects of integrated water resource management and potential development in the catchment.

In many cases there are more detailed objectives relating to specific issues or problems. These are provided in the strategies in Part 2.

4.3 METHODOLOGY

The methodologies used to present the water availability, water use and yield balance in this ISP are essentially the same as in the NWRS. While these are well documented in the WMA report (Report No. P WMA 12/000/00/0203), some of the more important points are highlighted here for convenience.

Afforestation and invasive alien plants both reduce the natural runoff from a catchment through increased rainfall interception and transpiration. This inevitably impacts on the yield available in the catchment. However, from a legal and economic point of view, afforestation and invasive alien plants need to be treated differently from a water resources perspective.

The impact of invasive alien plants (IAPs) is incorporated into the water resource and reflected as a reduction

in yield rather than a water use. DWAF is, however, actively trying to reduce this impact through the Working for Water programme and hence reducing the impact of IAPs listed in this report represents a possible opportunity to make more utilisable water available for productive use.

Afforestation is a declared streamflow reduction activity (SFRA) and subject to control by DWAF. The estimated impact of afforestation on available yield is listed as a water use.

Water for the ecological Reserve is water that must remain in the river and may not be abstracted. This is expressed as an estimated reduction in available yield and shown as part of the resource. The total resource available under natural conditions has been estimated and the utilisable resource reduced by the impact that the ecological Reserve has on this resource.

The categories used to define water use are the same as those used in the NWRS. Urban use in this context includes domestic and industrial use within the urban area. Large industries, which have their own source of water, are listed under *mining and bulk.* Rural use includes domestic use in small settlements and on farms as well as stock watering.

4.4 SURFACE WATER RESOURCES

Table 4.1 provides the mean annual runoff (MAR) per key area of the Mzimvubu to Mbashe ISP area.

Table 4.1: Natural Mean Annual Runoff and Ecological Reserve (million m³/a)

COMPONENT /KEY AREA	NATURAL MAR	ECOLOGICAL RESERVE [1, 2]
Mzimvubu	2 897	338
Pondoland	796	148
Mtata	836	163
Mbashe	1 126	203
Total	5 655	852

1) Quantities given are incremental, and refer to the key area under consideration only.
2) Total volume given, based on preliminary estimates. Impact on yield being a portion of this.
(Source: DWAF, 2003) [(21)]

There are no major dams in the Mzimvubu key area. The Vaal Augmentation Planning Study (VAPS) identified at a reconnaissance level that there is potential for water resource development on this river sometime in the future to meet part of the future water requirements of the Vaal River Supply Area.

The Mtata River key area is highly regulated but has an estimated natural MAR of 836 million m³/a. The major dam in this catchment is the Mtata Dam which is situated upstream of the town of Mtata.

The Pondoland key area is the area with the smallest runoff with a MAR of 796 million m³/a. This is still very significant when compared with other catchments in the country.

4.5 COMPARISON OF THE NWRS WITH THE UPDATED ISP WATER BALANCE

The ISP area was divided into key areas as described in section 2.1. These key areas are consistent with the key areas in the NWRS and the key areas for the groundwater resources. The following points are important when analysing the water resources of each key area to ensure consistent use of the same figures or to justify changes to the figures in the NWRS. This has been done in the ISP with respect to balancing water resources availability and water requirements for each area. The following approach was used in the ISP:

- The water requirements for the year 2000 level of development have been updated based on the latest available information from various sources. These are presented in a table that also indicates the current sources of water for the various water user sectors in the various key areas. These sources have been grouped into four main categories, namely, groundwater resources, surface water resources, transfers and return flows.

- The balancing of the water resources available with the water requirements is presented in a similar tabular format to that of the NWRS.

- The water balance figures for the ISP key areas were aggregated to reflect the key areas given in the NWRS. A comparison has been made between the NWRS and the ISP water balance. The comparison is discussed in each chapter of the key area. Where inconsistencies have been identified and there are justification for using ISP figures, motivations are given in the following chapters as to which figures have been used in the balancing of water resource availability with water requirements for the key area. The figures so determined are referred to as the strategy figures.

- The water requirements and the sources of supply to meet requirements were determined at quaternary catchment level. This was done in order to analyse where local deficits and local surpluses occur in each of the key areas. The purpose of providing water balance figures at quaternary catchment level is to provide the Regional Office with first-level assessments on where the water resource allocations (or licences) can be considered. Where the difference between available water resources and water requirements are small, then a detailed system analysis is recommended before a decision is made on water use allocation and licensing of the water resources. This is due to the high uncertainty (risks) in the level of confidence that can be placed on the strategy figures. Where the surplus is large water use allocation can be considered with little or no risk of failure in the system.

5 MZIMVUBU RIVER KEY AREA – WATER RESOURCE OVERVIEW, ISSUES AND STRATEGIES

5.1 INTRODUCTION

This chapter describes the characteristics of the Mzimvubu key area, the water availability and use and the yield balance, based on the updated information that was sourced during the ISP investigation. The issues, constraints and development opportunities available in the Mzimvubu key area are also described. The identification of these issues is based on the interviews conducted with the DWAF Regional Office personnel and the issues raised at the two ISP workshops. Information on the Vaal Augmentation Planning Study (VAPS) completed in 1996, has also been used in identifying the potential future development of the Mzimvubu catchment. The Eastern Cape Provincial Growth and Development Strategy (PGDS, 2003) [13] has also been a source of information. The detailed strategies to address these issues, constraints and opportunities for the use and management of the water resources of the key area are described in Part 2 of this ISP document.

5.2 MZIMVUBU KEY AREA CHARACTERISTICS

The Mzimvubu River is South Africa's largest undeveloped river (see Figure 5.1) with an MAR of 2 897 million m^3/a. As such, it presents huge opportunities for water resource development and for possible economic growth. The water resources of this catchment could be used for transfer to major development but is subject to approval at national level (NWRS, 2004, Appendix D12) [1].

The Mzimvubu key area covers a surface area of 20 060 km^2. It falls from an altitude of about 2 900 m on the Drakensberg escarpment to sea level over a distance of approximately 200 km (Republic of Transkei; 1990) [20]. The escarpment was formed as a result of the uplift of the interior of Southern Africa which took place over a prolonged period in relatively recent geological time. This process has caused the rivers to be deeply incised and to have well-developed meanders. There are therefore many sites that have potential for the generation of hydro-electricity on the Mzimvubu River and its four main tributaries, namely the Tsitsa, Tina, Kinira and Mzintlava rivers. There are waterfalls of some significance on the major tributaries of the Mzimvubu River. These are noteably the Tsitsa falls and the Tina falls where effective hydro-electric power generation development is possible. The high seasonal rainfall variation necessitates the construction of reservoir storage where hydropower schemes are considered.

Most of the Mzimvubu key area (approximately 17 000 km^2) falls within the Eastern Cape Province. A smaller but very economically significant area of approximately 3 060 km^2 lies within KwaZulu-Natal as shown in Figure 5.1. In this key area the Sisonke District Municipality is the local authority in KwaZulu-Natal while the rest of the local authorities lie in the Eastern Cape Province. This adds to the complexity of integrated water resource management in the area.

The population of the Mzimvubu key area is mainly rural. Approximately 10% of the population is located in the urban centres of Kokstad, Matatiele, Cedarville and Port St Johns. Kokstad has experienced water shortages since the construction of the large new prison near the town. The urban population is expected to increase by 4.5% in 30 years to 107 815 (DWAF; 2002) [23]. This increase will be due to migration from the rural areas because of people with HIV/AIDS seeking medical assistance. The annual urban population growth is expected to be only about 0.15% per annum. Table 5.1 presents the population figures of this key

area and the expected growth up to the year 2025.

The water requirements for the key area are not expected to change with the exception of Kokstad. Kokstad experiences periodic water shortages, and a strategy for water supply to the town was developed. This strategy is described in Part 2 of this document. Please refer to Strategy No 1.6.

The rural population of the Mzimvubu key area is expected to peak in 2005 and thereafter decline by approximately 0.3% per annum because of the prevalence of HIV/AIDS and migration to urban areas.

Table 5.1: Mzimvubu key area population distribution

	1995 Population	2025 Population	Average annual growth rate
Rural	907 268	821 312	-0.33%
Urban	103 191	107 815	0.15%
Total	1 010 459	929 127	-0.28%

5.3 WATER AVAILABILITY

There are a few small dams in the Mzimvubu catchment. The remainder of the yield available in the catchment is derived mostly from run-of-river. The run-of-river yield was determined independently as part of this ISP project using the Rapid Simulation Model and was found to be very similar to that given in the NWRS. No changes to the NWRS figures are therefore recommended. The water availability in the Mzimvubu key area is shown in Table 5.2.

Table 5.2: Water availability in the Mzimvubu key area (at 1:50 year assurance)

Resource category	Yield (million m^3/a)
Gross available surface water resource	241
Subtract:	
- Ecological Reserve (Impact on yield)	156
- Invasive alien plants (Impact on yield)	1
Net surface water resource	*84*
Ground water	3
Return flows	4
Total local yield	91
Grand Total	91


MZIMVUBU KEY AREA
Legend
Landuse
Cultivated: temporary - commercial dryland
Cultivated: temporary - commercial irrigated
Degraded: thicket & bushland (etc)
Degraded: unimproved grassland
Dongas & sheet erosion scars
Forest
Forest and Woodland
Forest plantations
Mines & quarries
Thicket & bushland (etc)
Urban / built-up land: residential
Waterbodies
Wetlands
Rivers
Dams
Quaternary Catchment Areas
Water Management Areas
International Boundaries
Provinces
Towns
LESOTHO
MVOTI TO MZIMKULU
KwaZulu-Natal
Eastern Cape
UPPER ORANGE
MZIMVUBU TO KEISKAMMA
Maluti
Matatiele
Cedarville
Kokstad
Mount Fletcher
Mount Ayliff
Mount Frere
Bizana
Flagstaff
Maclear
Ugie
Qumbu
Tsolo
Elliot
Lusikisiki
Nyandeni
Port St. Johns
Umtata
Encgobo
Ngqeleni
Mabheleni
Coffee Bay
Hopewell Dam
Poortjie Dam
Welbedacht Dam
Roodeberg Dam
Mountain Dam
Elandskuil Dam
Crystal Springs Dam
Noadu Dam
Figure 5.1

5.4 WATER REQUIREMENTS

Compared to the large water resource available in the Mzimvubu key area, the actual water use is small. The largest water requirement is that of the irrigation sector although even this is relatively small. The urban water use is by the towns of Kokstad, Cedarville and Matatiele.

There is a large area of afforestation in the Mzimvubu key area (73 000 ha) and this reduces the runoff by an estimated 80 million m^3/a. The NWRS gives the impact of afforestation on the available yield as 3 million m^3/a. This seemed very low for such a large area of afforestation and was therefore checked using reconnaissance level modelling techniques and an impact of 11 million m^3/a was determined. This is the impact of afforestation on the yield that is used in the ISP. All other current water requirements are the NWRS figures. Table 5.3 lists all the known current (year 2000) water uses in the Mzimvubu key area.

Table 5.3: Major water users/requirements in the Mzimvubu key area (at 1:50 year assurance)

User sector	Water requirement/ Impact on yield (million m^3/annum)
Irrigation	15
Urban	6
Rural	9
Mining and bulk	0
Afforestation	11
Total local requirements	41
Transfer out	0
Total local requirements	41

5.5 RECONCILIATION OF REQUIREMENTS AND AVAILABLE WATER

The reconciliation of the available water resource and the water requirements is given in Table 5.4.

Table 5.4: Reconciliation of the water requirement and the water resource in the Mzimvubu key area (all units are million m^3/a)

Key area	Available water			Water requirements			Balance
	Total Local yield	Transfers in	Total	Local requirements	Transfers out	Total	
Mzimvubu	91	0	91	41	0	41	50

Based on the figures shown in Table 5.4, there is a substantial surplus in the Mzimvubu key area, even in its undeveloped state. There is still large potential for developing the resource and making yields available for in-basin use or transfer to other catchments.

Although the reconciliation indicates a significant present surplus, some local deficits were identified. The local deficits are mainly in the smaller catchments where rural communities are dependent on run-of-river yield as a source of supply. The catchments identified with deficits are T33A, B, C and D as well as T32G, H and J.

5.6 WATER QUALITY

The sewage treatment works in the Mzimvubu key area are relatively small. There are water quality problems in the towns of Tsolo, Ugie and Maclear because of inadequate sewage treatment works resulting in overflows. Although water quality is in general not a major problem, there are potential quality problems particularly with groundwater and springs which are the sources of supply of many of the rural towns in the key area. However a specific water quality management strategy for the Mzimvubu key area is not justified. The above issues have been noted in the ISP area-wide water quality management strategy (see Strategy No 2.2). During flood events the rivers transfer high volumes of sediment.

5.7 FUTURE SCENARIOS

The Mzimvubu River is the largest undeveloped river in South Africa, and is characterised by high natural runoff and limited consumptive water use. No changes in water requirements are expected in the Mzimvubu key area in the short to medium term. The NWRS has identified this key area to be of strategic importance as regards possible future water transfers to other areas. Therefore any future large developments within the Mzimvubu catchment will be subject to authorisation at national level. The potential schemes to transfer water from the Mzimvubu River to the Vaal River Supply Area sometime in the future were identified as part of the VAPS. Expansion of forestry is also planned and a Strategic Environmental Assessment (SEA) has been commissioned to determine potential areas, viability and sustainability of forestry development.

The area currently under irrigation (only 3 600 ha) is very limited considering the size of the catchment whilst there is an extensive area under forestry, estimated at 73 000 ha. Although the Mzimvubu Basin Study (Republic of Transkei, 1990) [20] identified a larger total irrigation potential of 127 000 ha, a recent study conducted by DWAF identified a likely future development scenario for irrigation in the Mzimvubu catchment of 44 600 ha. This takes into account where the soils are suitable for irrigation, the steep topography, and overlap of competing users like forestry and dryland cultivation, as well as access roads and villages. A similar likely afforestation scenario is quoted as 120 000 ha, but the current Forestry SEA for the Eastern Cape could drastically reduce that area.

Water use for poverty eradication could be limited to run-of-river yield, or development of smaller local storage dams could be built. Even if the full irrigation of about 44 600 ha is developed, from a water availability point of view it would not exclude possible later large-scale development for transfers serving regional and national interests.

5.7.1 Water Balance and Reconciliation strategic perspective

The Mzimvubu River key area currently has surplus yield and significant potential can still be developed. This water can be used for development within the Mzimvubu catchment and for transfer to other areas. :

- Development within the catchment. The water resources study undertaken in 1990 (Republic of Transkei; 1990) [20] identified potential for hydro-electricity generation at the Tsitsa and Tina falls. This would require balancing storage in order to allow for the high seasonal variations in run-off from the catchments. It should be noted that the study was undertaken before the National Water Act was promulgated, which established the Reserve and resource-protection requirements, which would reduce the volume of water available for development within the catchment.

- Transfers to other areas. Even after reasonable and viable developments within the catchment are allowed for, it is likely that further water resource potential will remain available for development and transfer to other areas. A recent study (DWAF, 2004) [30] showed that the cost of such transfers will be high. Even local transfers to areas of need within the Eastern Cape Province, such as the Fish and Sundays catchments, could cost in the order of R15 / m^3. Such water transfers would hardly be justifiable for irrigation purposes. To take Mzimvubu River water to the Karoo areas further west will cost considerably more.The VAPS identified that, although currently not financially and economically viable, there could be justification for inter-basin transfer of water to the Vaal River Supply Area sometime in the future. All transfers between WMAs are under the control of the Minister. Authorisation for large-scale use of the Mzimvubu surplus water will have to be approved by the Minister, whether for use in Eastern Cape areas or in other provinces.

- Irrigation. It is estimated that up to 44 600 ha of new irrigation could possibly be developed within the Mzimvubu catchment. Due to the hilly topography of this key area such large-scale development will be very expensive. It will also require storage dams to secure supplies. Smaller, more localised developments would be more viable, especially if run-of-river sources are used. Even if only a portion of the full irrigation potential is developed it could make a significant contribution to the eradication of poverty in the region.

- Afforestation. Further afforestation is regarded as the most likely, the most affordable and possibly also the most profitable further use of Mzimvubu River water in the short to medium term. The report on Water Utilisation Opportunities: Mzimvubu River Basin (NWRP: 2004)[30] gives a possible afforestation scenario of 120 000 ha if dedicated water resource development (dams) is undertaken to make up for the resulting streamflow reduction effect. If local communities embrace afforestation as an acceptable land-use, it could also go a long way towards reducing poverty in the area.

- Hydro Power generation. This is not a consumptive user of water except for dam evaporation and some other minor losses. It does however tend to cause major changes to natural river flow patterns which lead to serious environmental impacts and a reduced ability to supply Reserve requirements. Although the hydropower potential of the Mzimvubu River is large, Eskom is at present considering

only minor development.

- Other. It is expected that, for the foreseeable fture, other water uses such as urban and industrial supply and tourism will take up only a small fraction of the water available in the Mzimvubu Key Area.

5.7.2 Water resource protection strategic perspective

There are a number of wetlands particularly in the upper catchments of the Mzimvubu key area. These wetlands are productive ecosystems and are vital for preserving biological biodiversity and hydrological integrity, but extensive agricultural development and subsistence farming has already had a major negative impact. The wetland inventory programme (Mondi Wetlands) is in the process of listing these wetlands and categorising their importance. A programme for classification and rehabilitation of the wetlands is required once the wetlands inventory programme is completed.

- Most of the wastewater treatment works in the key area are not working properly because of capacity and resource constraints within local municipalities. The Tsolo local authority is upgrading its pond system and disposing of effluent by irrigation.
- The existing wastewater treatment works at Maclear is becoming problematic because of increased of sewage volumes. The WwTW now caters for many more users than it was designed for.
- The influx of people into Maclear and Ugie is impacting on the solid waste of the towns. The town of Mt Fletcher relies on groundwater which may be contaminated if the siting of the solid waste site is not done correctly.
- The town of Maluti has conservancy tanks, which are overflowing. This is causing environmental damage.
- Port St Johns does not have a wastewater treatment works. Their sewage is discharged directly to the sea. It has a new solid waste site.

In order to maintain the quality of the water resource in the Mzimvubu key area, DWAF must engage with the local authorities to ensure compliance with source-directed control measures.

5.7.3 Water Use Management

DWAF must promote and support co-operative governance to ensure that there are no delays in investment opportunities being developed in the Mzimvubu key area. It is important to fast-track administrative processes where development will contribute to poverty eradication in the key area.

A licence application for developing 83 hectares of Eucalyptus and wattle has been received from the Mvenyane Landcare and Wattle Management Committee. DEAET's record of decision has not been received and that is delaying finalisation of the licence application.

Verification and validation of existing water use has not been done.

5.7.4 Water conservation and water demand management (WC/WDM)

With increasing water demand within the Mzimvubu ISP key areain, adequate attention to developing and implementing water conservation and water demand management strategies is becoming increasingly important. WC/WDM holds tremendous potential particularly in the domestic water use sector where it has

been identified that water use is highly inefficient. It is estimated that losses account for more than half of the domestic water use. Very few WC/WDM measures have been implemented in the Mzimvubu key area. The Department's strategic approach to WC/WDM in the ISP area is described in detail in the strategy tables (See Strategy No 4.1).

6 PONDOLAND KEY AREA – WATER RESOURCE OVERVIEW, ISSUES AND STRATEGIES

6.1 INTRODUCTION

This chapter describes the characteristics of the Pondoland key area and the yield balance in the area based on the updated information that was sourced during the ISP investigation. The issues, constraints and development opportunities available in the Pondoland key area are also described. The information was obtained from interviews conducted with DWAF Regional Office personnel, the two ISP workshops and the Eastern Pondoland Basin Study that was completed in 2000. The detailed strategies to be adopted by the Department for the management of the water resources of this key area are described in Part 2 of this ISP document.

6.2 PONDOLAND KEY AREA CHARACTERISTICS

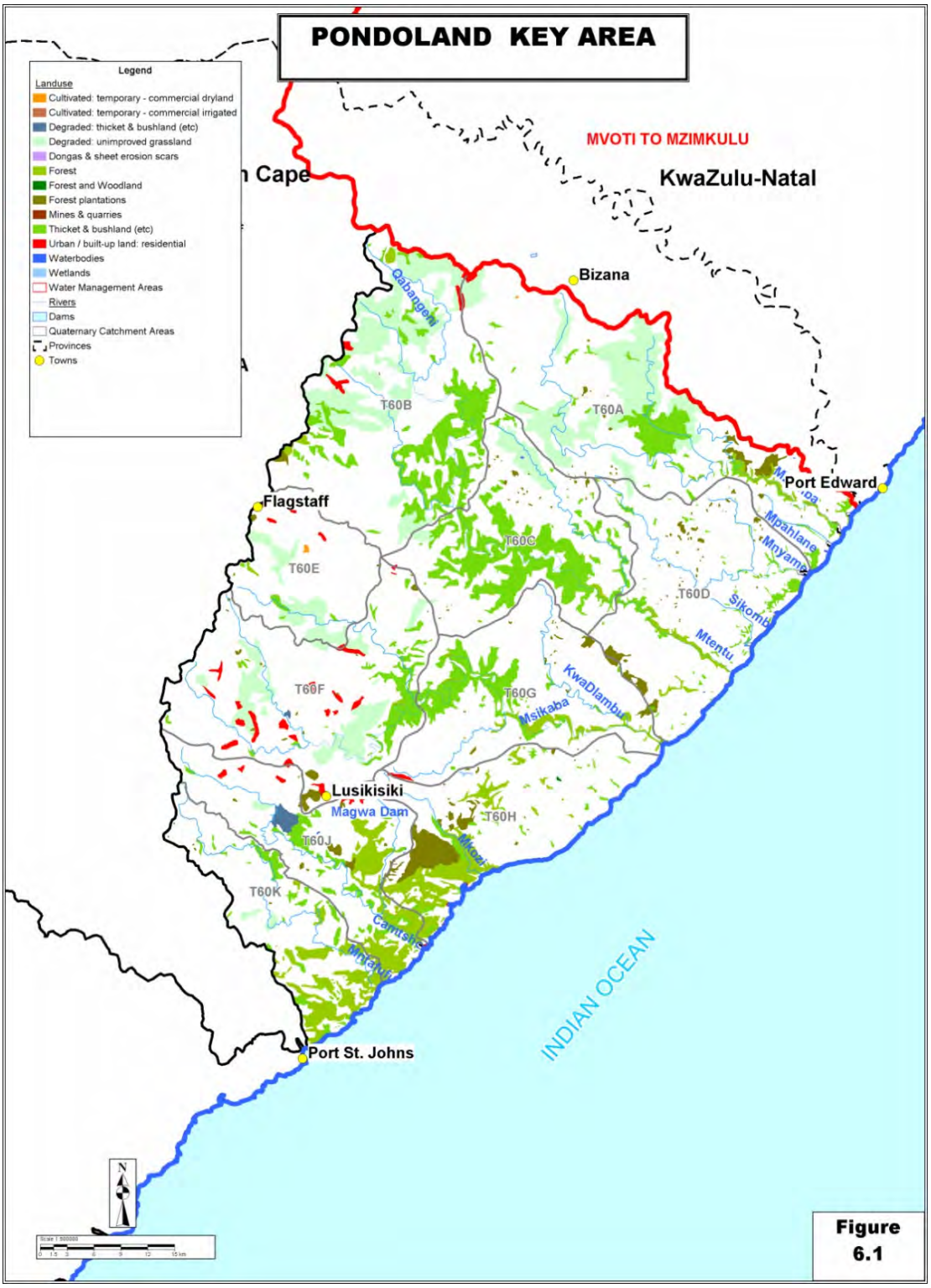
Figure 6.1 shows the main features of the Pondoland key area. The Pondoland key area consists of a relatively small undeveloped coastal area characterised by high rainfall. The main rivers are the coastal rivers of Mtentu and Msikaba.

The total 1995 population of the Pondoland key area was estimated at 380 000. According to MarkData the population is expected to decline to approximately 347 480 by the year 2025. The majority of the population (approximately 96%) is rural with 4% situated in the towns of Lusikisiki and Flagstaff. Table 6.1 shows the expected population in the year 2025.

Table 6.1: Pondoland key area population distribution

	1995 Population	2025 Population	Average annual growth
Rural	366 381	330 905	-0.34%
Urban	14 300	16 575	0.49%
Total	380 681	347 480	-0.30%

The natural environment of the key area and particularly the coastal belt, has high conservation value (DWAF; 2001). Ecological water requirements to maintain the ecosystem health are relatively large. The area includes the Mkambati Nature Reserve situated between the Mtentu and Msikaba rivers. Although the area is of high ecological importance, it is also the subject of mining development there are proposals to mine heavy mineral deposits in the coastal sands being investigated.



The main land-use activity in the Pondoland key area is commercial forestry and rainfed agriculture. There is potential for forestry expansion.

Surface water in the key area is largly unregulated with the Magwa Dam on the Mkozi River the only registered dam in the area (see Appendix A1). The Magwa Dam supplies a small plantation south of

Lusikisiki. The main water user in the key area is commercial afforestation. Water use is otherwise very limited, consisting of rural use and the Magwa tea plantation (PGDP; 2003) [13]. The main town of Lusikisiki has been experiencing water shortages. The study conducted by DWAF (DWAF, 2001) as well as a study by O R Tambo District Municipality investigated options to supply supplementary water to the town. The DWAF study identified feasible and economically viable surface water and groundwater sources.

The Pondoland key area forms part of the Pondoland Spatial Development Initiative (SDI) which aims to open up the area's huge tourism potential. Poor access to the area has however always been problematic and has probably contributed much to the entrenchment of poverty in the area. As a result the National Road Agency is in the process of investigating a new route for the proposed N2 toll road in order to make the area accessible for the proposed mining of heavy minerals, tourism and commercial forestry. There is however a lot of resistence from environmental groups against the proposed Wildcoast N2 route, because it will traverse prestine rural areas.

Growth in tourism and any mining development will require additional sources of reliable water supply at a high level of assurance. Augmentation of run-of-river supplies from either groundwater sources or regulation of the rivers will be required. There is potential for conjunctive use of surface water and groundwater supplies in this key area.

6.3 WATER AVAILABILITY

The NWRS gives the volume of water available from the surface water resources of the Pondoland area as 4 million m^3/a. This seems very little compared with the high MAR of 796 million m^3/a although most of the available water is from run-of-river. The key area is deeply incised by the main rivers. From a topographical and geological perspective, the Pondoland key area is not ideal for the construction of dams, and there are very few dams in the area. The only significant dam is the Magwa Dam with a yield of only 2 million m^3/a. There are also several farm dams in the Mzintlava River catchment.

Table 6.2: Water availability in the Pondoland Catchment (at 1:50 year assurance)

Resource category	Available/impact on yield (million m^3/annum)
Gross surface water resource	30
Subtract:	
- Ecological Reserve (Impact on yield)	26
- Invasive alien plants (Impact on yield)	0
Net surface water resource	*4*
Ground water	1
Return flows	0
Total local yield	5
Transfer In	0
Grand Total	5

6.4 WATER REQUIREMENTS

The water use in the Pondoland key area is very limited. The largest user is the rural sector, which makes use of run-of-river yield.

There is some afforestation in the key area estimated at 1 000 ha, but the impact of this on the available yield is not significant.

Table 6.3 lists all the known current (year 2000) water uses in the Pondoland key area.

Table 6.3: Major water users/requirements in the Pondoland key area (at 1:50 year assurance)

User sector	Water requirement/ Impact on yield (million m^3/annum)
Irrigation	0
Urban	1
Rural	3
Mining and bulk	0
Afforestation	0
Total local requirements	*4*
Transfer out	0
Total local requirements	4

6.5 RECONCILIATION OF REQUIREMENTS AND AVAILABLE WATER

The current reconciliation of the available water resource and the water requirements is given in Table 6.4.

Table 6.4: Reconciliation of the water requirement and the water resource in the Pondoland key area (all units are million m^3/a)

Key area	Available water			Water requirements			Balance
	Total Local yield	Transfers in	Total	Local requirements	Transfers out	Total	
Pondoland	5	0	5	4	0	4	1

Based on the figures shown in Table 6.4, there is only a very small surplus available in the Pondoland key area. However the resource can easily be augmented by constructing a few small dams, since the runoff is high. The Eastern Pondoland Basin Study (DWAF, 2004) [25] has identified a number of potential dam sites in this key area. It should also be borne in mind that the utilisable yield is very much dependent on the impact

that the ecological Reserve has on the natural flow. This has been determined using accepted desktop methodology. However the ecological water requirements for the estuaries are not taken into account in the calculation of the figures in Table 6.4 because, they are not available, but in all likelihood the estuary requirements will drive the Reserve requirements given the fact that the estuaries are the most ecologically sensitive areas.

6.6 WATER QUALITY

The resource quality ojectives in the Pondoland key area have not been set as part of the Reserve determinations. This is because only desktop Reserves were conducted in the area. The main water quality issues and concerns are the following:

- Lusikisiki WwTW: This Wastewater Treatment Works (WwTW) is overloaded because it is now treating more sewage than it was designed for. The WwTW was to service the town but other surrounding areas are now being linked to the system. Some of the areas are serviced by conservancy tanks, or septic tanks. There are potential groundwater pollution problems. Groundwater development is a likely option to augment the water supplies of Lusikisiki. The siting of boreholes will be crucial to avoid areas where groundwater is polluted and this must be done according to DWAF guidelines.

- Lusikisiki solid waste sites: Lusikisiki is still operating an outdated solid waste site. This site needs to be closed. Leachate from the solid waste site could cause groundwater pollution if it is not closed and properly maintained.

- Flagstaff WwTW: There are conservancy tanks, which are taken to the commonage for emptying. That creates potential for the pollution of groundwater, which is the main source of water supply to the town. The local prison has its own oxidation ponds.

- Water-borne diseases: The main existing sources of supply to the rural communities in the Pondoland key area are run-of-river supply and groundwater. There have been cholera outbreaks in the Lusikisiki area. This is usually a reflection of poor water supply and sanitation in the area.

6.7 PONDOLAND KEY AREA STRATEGIC PERSPECTIVE

6.7.1 General

The Pondoland key area, as with the other key areas of the Mzimvubu to Mbashe ISP area, is well-endowed with natural water resources, but high ecological Reserve requirements will affect the volumes available for consumptive use. The area is virtually undeveloped at present. The water requirements are very limited, and consist mostly of rural water use, and use by the small town of Lusikisiki. Rural water users make use of run-of-river flow. The small Magwa tea plantation is only irrigated during infrequent periods of low rainfall.

Irrigation in this key area is not significant but there are 29 000 ha of afforestation. This does not significantly impact on the available water resources.

The strategy for this key area is to maintain the *status quo*. However, if the proposed mining development is to be pursued the necessary water use license should be carefully considered. Dryland agriculture should be encouraged because of the favourable climate and rainfall conditions of the key area.

6.7.2 Water Balance and Reconciliation strategic perspective

The current water availability in the Pondoland key area indicates a surplus of only 1 million m³/a. Further surface water potential exists from the potential dam sites identified in the Eastern Pondoland Basin Study.

As far as future urban water is concerned only small future increases in requirements are envisaged. It has however been identified that Lusikiki needs supplementary water, as do the many villages that surround the town. The Eastern Pondoland Basin Study [25] identified the construction of the Zalu Dam in the Xura River just north of the town and /or the development of groundwater sources, as the best augmentation options. The Directorate: Options Analysis is busy with a feasibility study of the groundwater development option. The study will be completed in 2005. The O.R. Tambo District Municipality is also investigating groundwater development for Lusikisiki. Some holes have already been drilled. Options Analysis and O.R. Tambo District Municipality should collaborate and preferably pool their efforts.

The general development of the key area, and in particular the coastal area, nature reserves and tourism will depend largely on a decision regarding the proposed new N2 toll road route. The requirements for those developments will not be significant and should not pose problems in this well watered region.

There is potential for development of dryland agriculture and forestry in the Pondoland key area. The recently commissioned Forestry SEA will provide a more detailed assessment of where forestry development can take place and what mitigation measures will be required to ensure environmental protection given the high ecological importance and sensitivity of the key area.

The Pondoland key area has been identified for mining of heavy minerals. Although DWAF has not been approached with a licence application to allocate water for this potential development, the mines should be encouraged to approach DWAF long before water is required. This should be part of the business plans. The proposed heavy metal mining development along the Pondoland Coast would require considerable volumes of water. An option to meet mining water requirements will be to import water from the Mzimvubu River.

6.7.3 Water resource protection - Reserve and Resource Quality Objectives strategic perspective

The Mkambati Nature Reserve, which is of high ecological importance and sensitivity, is situated in this key area. The ecological Reserve conducted for the Eastern Pondoland Basin Study was based on the desktop method and did not take into account the ecological water requirements of the estuaries, which are still in a near pristine condition. The protection of the resource base through the implementation of the ecological Reserve and determining the resource quality objectives of the streams in the key area are essential. This strategy is described in detailed in Strategy No 2.2. However, a balance between resource protection and development of the key area to improve the welfare of the communities is essential and should be considered.

Resource Quality Objectives (RQOs) for this key area have not been determined. These need to be set and a monitoring protocol established. This is also discussed in Strategy No 2.2 in Part 2.

6.7.4 Water conservation and water demand management (WC/WDM)

Lusikisiki urban WC/WDM: A situation assessment and a mass balance analysis undertaken for the town has identified that the water losses are high.

DWAF must encourage and provide support to the local authorities to develop their business plans which reflect targets for water use reduction based on best water-use practices for the domestic sector and the level

of service. Strategy No. 4.1 describes the strategic approach and management actions required to address this issue.

6.7.5 Waterworks management

System Management: According to the DWAF Regional Office, Magwa Dam is not being fully utilized and only sometimes supplies water to the tea plantation. No environmental releases are being made from the dam.

Dam Safety: Magwa Dam is owned and operated by DWAF. There is a permanent leak of about 3 –4l/son the construction joints of the intake works.

Operation & Maintenance: The Magwa Dam is also owned and operated by DWAF. The dam is underutilized. It supplies water to the tea processing factories. No environmental releases are made from the dam to meet ecological water requirements downstream of the dam.

7 MTATA KEY AREA – WATER RESOURCE OVERVIEW ISSUES AND STRATEGIES

7.1 INTRODUCTION

This chapter describes the characteristics of the Mtata key area, the available water, water requirements and the yield water balance based on updated information that was sourced during the ISP investigation. The water resource management issues, constraints and opportunities in the key area are also described. This is mainly based on the interviews conducted with DWAF Regional Office personnel, the two ISP workshops, the Mtata River Basin Study (MRBS) that was completed in 2001 as well as information contained in the NWRS. The detailed strategies to address these issues, constraints and opportunities for the use and management of the water resources of the key area are described in Part 2 of this ISP.

The Mtata Dam is the only significant water resource development in the area. The dam, with a capacity of 253,7 million m^3, is situated in the upper reaches of the Mtata River catchment and supplies water to the town of Mtata, the largest water user in the study area. The allocation to Mtata is 60 Ml/d although the actual average is only about 14,5 million m^3/a. The dam is also used by Eskom to generate hydropower at the First and Second Falls. Table 7.2 lists the dams in the Mtata key area.

7.2 MTATA KEY AREA CHARACTERISTICS

The Mtata key area is shown in Figure 7.1. The main river is the Mtata River which drains the T20 catchment. There are also several smaller coastal rivers with the Mngazi River (T70) the most significant. The T80 catchment is also in the key area. The total catchment area is 5 526 km^2. The mean annual runoff (MAR) of the Mtata River catchment is approximately 382 million m^3.

The MRBS gave the total population of the Mtata key area as approximately 630 000 in 1995, and projected it to decline to 566 000 in the year 2020 for the low growth scenario, and 607 000 for the high growth scenario. However, the demographic study commissioned by DWAF (MarkData, 2001) for the NWRS, indicated that the 1995 population of the Mtata key area was approximately 720 000. The ISP strategies have been based on the information contained in the NWRS.

Table 7.1: Mtata key area population distribution

	1995 Population	Estimated 2025 Population	Average annual growth rates
Rural	514 000	464 200	-0.34%
Urban	205 700	217 100	0.18%
Total	719 700	681 300	-0.18%

Although the Mtata key area is heavily populated, it has a low level of economic development. The level of economic activity has been gradually decreasing. This is to some extent offset by growth in the informal sector. Most industries and businesses which once flourished in the area and particularly in Mtata town, the former capital of the Transkei, have since relocated, mainly to East London because of better access to markets. The subsidy structures which once favoured investment in Mtata are no longer in place.

There are also several smaller rural and coastal towns in the key area. Rural poverty and lack of employment present serious problems. Major intervention would be required to bring about an economic turnaround in this key area. Any developments should be focused on creating employment and poverty eradication. The Provincial Growth and Development Strategy identified the urgent need to stimulate economic development in the whole ISP area and particularly the Mtata key area.

The agricultural sector is poorly developed and largely of subsistence nature. Small patches of irrigation takes place with water use estimated at about 2 million m^3/a. Langeni Forest is a major contributor to the economic value added and employment of this key area. There are two main sawmills in the area, Langeni and KwaBhaca. Relatively little manufacturing based on commercial timber is taking place.

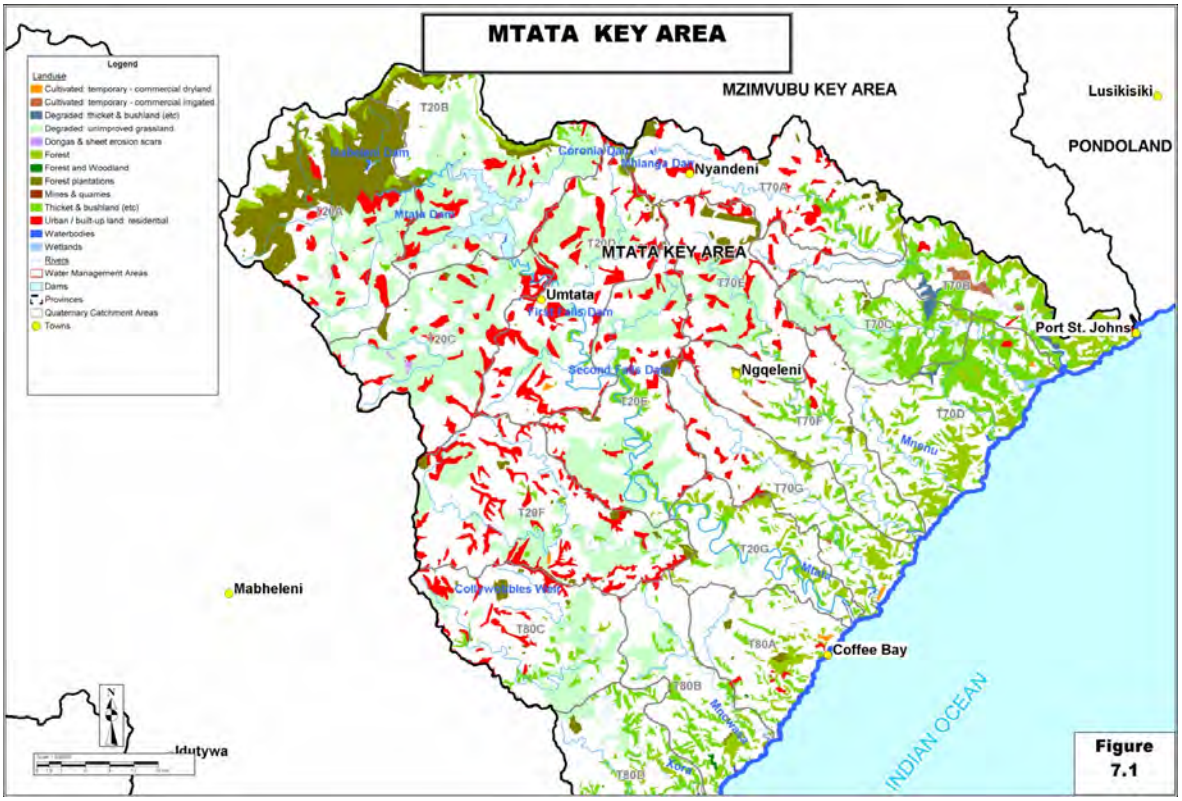


Table 7.2: Dams in the Mtata River key area

DAM NAME	RIVER	CATCHMENT AREA (km^2)	GROSS CAPACITY (million m^3)	YIELD (1:50 YEAR) (million m^3/a)
Mtata Dam	Mtata River	886	253.7	136
Mabeleni Dam	Mhlahlane River	10	2.23	1.09
Corana Dam	Corana River	5	0.95	0.34
First Falls Dam	Mtata River	Included below	0.844	N/A
Second Falls Dam	Mtata River	1690	1.2	N/A
Mhlanga Dam	Mhlanga River	15	1.53	0.78
Bulolo Main Dam	Bulolo River	Unknown	0.59	0.33
Upper Bulolo Dam	Bulolo River	Unknown	0.03	0.05
Nzwakazi Dam	Unnamed Tributary	Unknown	0.07	0.10
Lubanzi Dam	Unnamed Tributary	Unknown	Unknown	Unknown

7.3 COMPARISON OF THE NWRS WITH UPDATED ISP WATER BALANCE

A comparison of the NWRS figures with the information obtained for the ISP on the water resource availability and use was undertaken for the Mtata River key area. The basis of the comparison was discussed in Section 4.4.

Table 7.3 shows the water availability comparison.

Table 7.3: Comparison of the water availability in the Mtata River key area (year 2000) between NWRS and ISP

Resource category	Available / Impact on yield (million m³/a)	
	ISP	NWRS
Gross available surface water resource	172	162
Subtract:		
- Ecological Reserve (Impact on yield)	29	29
- Invasive Alien vegetation (Impact on yield)	4	4
Net surface water resource	*139*	*129*
Ground water	1	1
Return flows	6	6
Total local yield	146	136

The net surface water available in the ISP was found to be 10 million m³/a higher than the NWRS figure. This is because the yields of the smaller dams were not included in the NWRS. The ISP figures have been used in the reconciliation and the development of the strategies.

Table 7.4 presents a comparison of the water requirements between the NWRS and the ISP for the year 2000. Approximately 293 ha are currently irrigated in the Mtata key area as determined in the MRBS. The total irrigation water requirement is approximately 2 million m³/a (DWAF, 2001) [17]. In the MRBS the potential for sustainable irrigation in this key area was estimated at 1 200 ha. This is located mainly in the Mngazi (507 ha) and the Mtata (497 ha) river catchments. The NWRS quoted an irrigation use of 4 million m³/a, but the MRBS figure is more recent and regarded as more reliable. The demand of the various sectors is given in table 7.4.

Table 7.4: Comparison of water requirements (year 2000) between NWRS and ISP

User sector	Requirement/impact on yield (million m^3/a)	
	ISP	NWRS
Irrigation	2	4
Urban	15	15
Rural	11	5
Industrial and mining	0	0
Afforestation	29	29
Total requirement	57	53

There is a significant difference in the water requirements for the rural sector. Approximately half of the difference is attributable to stock watering which was not ncluded in the NWRS figure. Cattle farming is important in this key area and stock watering is therefore critical. The revised figure was used in the ISP.

7.4 WATER AVAILABILITY

The water sources of the Mtata key area are dominated by the Mtata Dam. Its capacity of 254 million m^3 is approximately 120% of the MAR. The 1:50 year yield of the dam is 136 million m^3 /a as shown in Table 7.2. The impact of the Reserve on the yield of this dam is not really relevant since most of the water is released into the river for hydropower generation. However, the temporal distribution of the releases has a significantly negative impact on the ecological functioning of the Mtata River downstream of the dam, including the estuary.

There are some smaller dams which contribute about 10 million m^3/a to the available yield of the Mtata key area. The total surface yield of the area is estimated at 146 million m^3/a after making allowance for the ecological Reserve and reduction in yield due to alien invasive plants.

The Mtata catchment is the one key area in the Mzimvubu to Mbashe ISP area in which invasive alien plants are a problem. The reduction in runoff due to invasive alien plants, situated mostly upstream of the Mtata Dam, is estimated at 8 million m^3/a and this reduces the yield of the Mtata Dam by an estimated 4 million m^3/a.

7.5 WATER USE

Unlike the other three key areas of this Mzimvubu to Mbashe ISP area, there is significant water use in the Mtata catchment. The largest water user by far is the forestry sector, which reduces run-off in the Mtata River by an estimated 37 million m^3/a. Forestry in the Mtata catchment is situated mostly upstream of the Mtata Dam where it has a major impact on the yield of this dam, reducing the yield by an estimated 29 million m^3/a.

The only other large water users are in the urban sector, with an estimated water use of 15 million m^3/a, and

the rural sector, with an estimated requirement of 11 million m^3/a. The urban water requirement is mainly the requirement of Mtata and its surrounding communities.

There are two relatively small hydro-electric power generation schemes at First and Second falls on the Mtata River with a combined capacity of 17 MW and releases are made from Mtata Dam. Releases vary between about 6.9 m^3/a in summer to 1,7 m^3/a in winter.

Table 7.5: ESKOM operating rules

Season	Months	Load Factor (%)	MWC @100%	Flow (m^3/s)
Summer	October to March	20	3.4	6.9
Winter	April to September	5	0.85	1.7

Table 7.4 lists all the known current (year 2000) consumptive water uses in the Mtata key area.

7.6 WATER RESOURCE ISSUES, CONSTRAINTS AND OPPORTUNITIES

7.6.1 Reconciliation of requirements and available water

The reconciliation of the available water (yield) and the water requirements is given in Table 7.6.

Table 7.6: Yield balance of the Mtata key area for the year 2000 (million m^3/a)

Available water			Water requirements			Balance
Total local yield	Transfers in	Total	Local requirements	Transfers out	Total	
146	0	146	57	0	57	89

Based on the figures shown in Table 7.6, there is a substantial surplus in the Mtata key area. It must be borne in mind, however, that this surplus relates mostly to the yield available from the Mtata Dam, which is actually used non-consumptively for hydropower generation. The surplus yield is therefore mostly only available downstream of the hydropower stations at First and Second falls, and would be subject to the release patterns required for power generation.

Potential exists for the expansion of afforestation in the coastal areas. However, further afforestation will have an impact on the run-of-river yield and could severely impact on the freshwater requirement of the estuaries, such as the Mngazi, which are tourist attractions. The SEA study underway for forestry in the Eastern Cape should address the mitigation measures for these negative impacts. Strategy No 3.3 deals with afforestation.

7.6.2 Future scenarios

No changes are expected in the Mtata River key area in the short to medium term. In the long term the population is expected to decline (see Table 7.1). Projected growth in water demand to support improved levels of service is offset by the decline in the population although the demand nodes will shift to the urban areas. There is potential for increasing the area under irrigation by 1200 ha in the future. Irrigation of this area would require approximately 7 million m^3/a of additional water. Approximately 3.5 million m^3/a is required in

the Mtata catchment and the remainder in the Mngazi catchment. The reduction in power generation can make more water available for this use if the decision is made to reduce power generation from the Mtata River in the future.

7.7 MTATA RIVER KEY AREA STRATEGIC PERPSECTIVES

7.7.1 General

The Mtata key area is well-endowed with natural water resources. In the case of the Mtata catchment, these resources have been developed by the construction of the Mtata Dam. The yield of the Mtata Dam is used mostly for generating hydropower, and since this is a non-consumptive use, there are substantial surpluses downstream, depending on when power is generated. Use of that surplus water will have to fit in with the power generation pattern, or re-regulation storage will have to be provided.

The consumptive water use in this key area is mostly by commercial forests. There is an estimated 29 800 ha of exotic forests, situated mostly in the catchment of the Mtata Dam, and this has a large impact on the yield of the dam. The other significant water use is that of the urban sector, with the town of Mtata accounting for most of the urban water use in this key area. The area currently under irrigation (293 ha) is very limited considering the size of the catchment and the availability of water.

This surplus could be used for:

- Additional irrigation, with an area of approximately 1 200 ha being available in the Mngazi and Mtata River catchments
- Community garden projects
- More afforestation
- Other productive uses, such as tourism.

The strategy for this key area is essentially the same as that for the other key areas in the Mzimvubu to Mbashe ISP area, and that is, how best to utilise surplus water that is available. The following are the major issues and broad strategic perspectives that are specific to the Mtata key area.

7.7.2 Water balance and reconciliation strategic perspective

The Mtata River Basin Study [17] provides a comprehensive understanding of the available water as well as water requirements in the key area. There is an apparent surplus of nearly 90 million m^3/a, but the use of that water for future developments in the area will depend to a large extent on the continued use of water from the Mtata Dam for power generation. The yield of the Nqadu Dam, although relatively small, is also not being used, but there is a proposal to utilise it to supplement the water supplies to the Mhlanga Water Treatment Works.

The Mhlahlane water supply scheme has an allocation of 0.62 million m^3/a from the Mabaleni Dam (with a yield of approximately 1.09 million m^3/a). However, the scheme is currently relying on run-of-river yield. Although the assurance of supply is low, DWAF has never been requested to make releases from the Mabeleni Dam in terms of this allocation. The reliance on run-of-river yield for the Mhlahlane Water Supply Scheme, particularly during low flow, has a negative impact on the Reserve (see Strategy No 1.3).

7.7.3 Water resource protection strategic perspective

Reserve determinations for the rivers of the Mtata key area were undertaken at an intermediate level during the Mtata River Basin Study. As part of the MRBS, an intermediate Reserve determination was carried out for the Mtata River estuary, rapid Reserve determinations were made for the Xhora and Mngazi estuaries, and desktop estimates were made for the eight other estuaries in the Mtata key area. The recommended ecological flow requirements (EFR) for the estuaries are greater than the recommended requirements for the rivers.

The operation of the First and Second Falls hydro-electric power stations affects the flow regime by altering the natural flow pattern and thereby affecting the ecological functioning of the biota in the Mtata River. The Reserve determination that was done for the Mtata River indicates that the water requirements for the estuary are quite significant and that at certain times of the year there are shortfalls in supplying the EFR at the Mtata Estuary under the current release pattern for hydropower generation (JLB Smith Insitute, 2001) [(8)]. Another major problem encountered is that the EFR required during the low flow periods is being exceeded. This has a significant impact in that more freshwater than is required by the Mtata Estuary is being supplied. This has a negative impact on the biotic conditions of the estuary.

The income generated from hydropower generation is estimated at about R2.5 million per annum. There is a need to balance the benefits from hydropower generation with the opportunity cost of protecting the estuary for ecological reasons and for tourism development.

Eskom has indicated that the two hydropower schemes are of strategic importance in providing stable power distribution to the Eastern Cape. There is the potential that dependance on the Mtata hydropower stations can be reduced by the construction of another transmission line from the Eskom network. The recommended strategy is for DWAF to enter into discussion with Eskom regarding the future of the Mtata power schemes.

7.7.4 Water conservation and water demand management (WC/WDM)

There is a need for WC/WDM in the main urban areas of the Mtata key area. A situation assessment of the town of Mtata, funded by DWAF, identified high water losses (WRP, 2002) [(26)]. A key issue identified in the study concerns the relatively high volumes of sewage produced. The sewage flows are so high that the existing sewage treatment works are unable to cope, and as a result significant quantities of untreated sewage enter the Mtata River. This in turn poses serious health hazards to the many people who depend on the Mtata River for their water, and who are unable to satisfactorily treat the water. The excessive sewage flows will eventually lead to the expansion of the sewage treatment works, which is costly. If the sewage flows could be reduced through implementation of WC/WDM measures, expansion might not be required.

Large water losses and wastage also occur in other towns in the key area namely, Nqgeleni and Mqanduli. Although the WSDPs describe the need for implementation of WC/WDM measures in the urban areas of the Mtata key area, they do not clearly highlight the situation with regard to unaccounted-for water losses in existing water supply infrastructure and the potential for implementing WC/WDM measures. Most of the urban areas in the catchment are looking at augmenting their existing water supply infrastructure, whereas the proposed strategy is to ensure that the King Sabata Dalinyebo (KSD) Municipality, the water services authority in the key area, makes more efficient use of existing supplies through WC/WDM before new supplies are developed. This would eliminate or at least reduce the cost of further water resource development as well

as the extended sewage treatment works in areas such as Mtata. WC/WDM will improve the water resource protection measures required (particularly for the pristine estuaries) in the coastal rivers. WSDPs should describe all the measures required to implement WC/WDM.

7.7.5 Water quality management

The MRBS (DWAF, 2001) [17] identified that the water quality immediately downstream of the Mtata Dam and below the town of Mtata was very poor and may be deteriorating. Water quality problems have also been identified in the other catchments such as Mngazi. There are three main reasons for the deteriorating water quality situation, particularly in the Mtata River. These are:

(i) Overflow of untreated sewage into the Mtata River due to the capacity problems of the existing sewage pump stations and the sewage treatment works;

(ii) lack of sanitation infrastructure in rural and informal settlements in the catchments; and

(iii) soil erosion problems.

The impacts of these factors are discussed in detail in Strategy 2.2.

Most of the communities along the Mtata River use polluted river water for drinking purposes. There have been reported cases of water-borne diseases such as cholera in the catchment. A strategy is required to reduce pollution in the Mtata River and to implement water quality objectives in the Mtata key area.

The implementation of the dense settlement programme is essential in Mtata and surrounding areas.

8 MBASHE KEY AREA – WATER RESOURCE OVERVIEW AND STRATEGIC PERSPECTIVE

8.1 INTRODUCTION

This chapter describes the characteristics of the Mbashe key area and the yield water balance based on updated information gathered during the ISP investigation. The water resource management issues, constraints and available opportunities in the Mbashe ISP key area are also described. The detailed strategies to address these issues are described in Part 2 of this ISP document.

8.2 MBASHE KEY AREA CHARACTERISTICS

Figure 8.1 presents the Mbashe key area which has a total surface area of 8 679 km^2. The mean annual precipitation (MAP) in the area is 810 mm and the total naturalised MAR is 1 129 million m^3/a. The main river in the key area is the Mbashe River (T10). Its main tributaries are the Xuka and Xinika. There are also several coastal rivers (T90) including the Nqabara River.

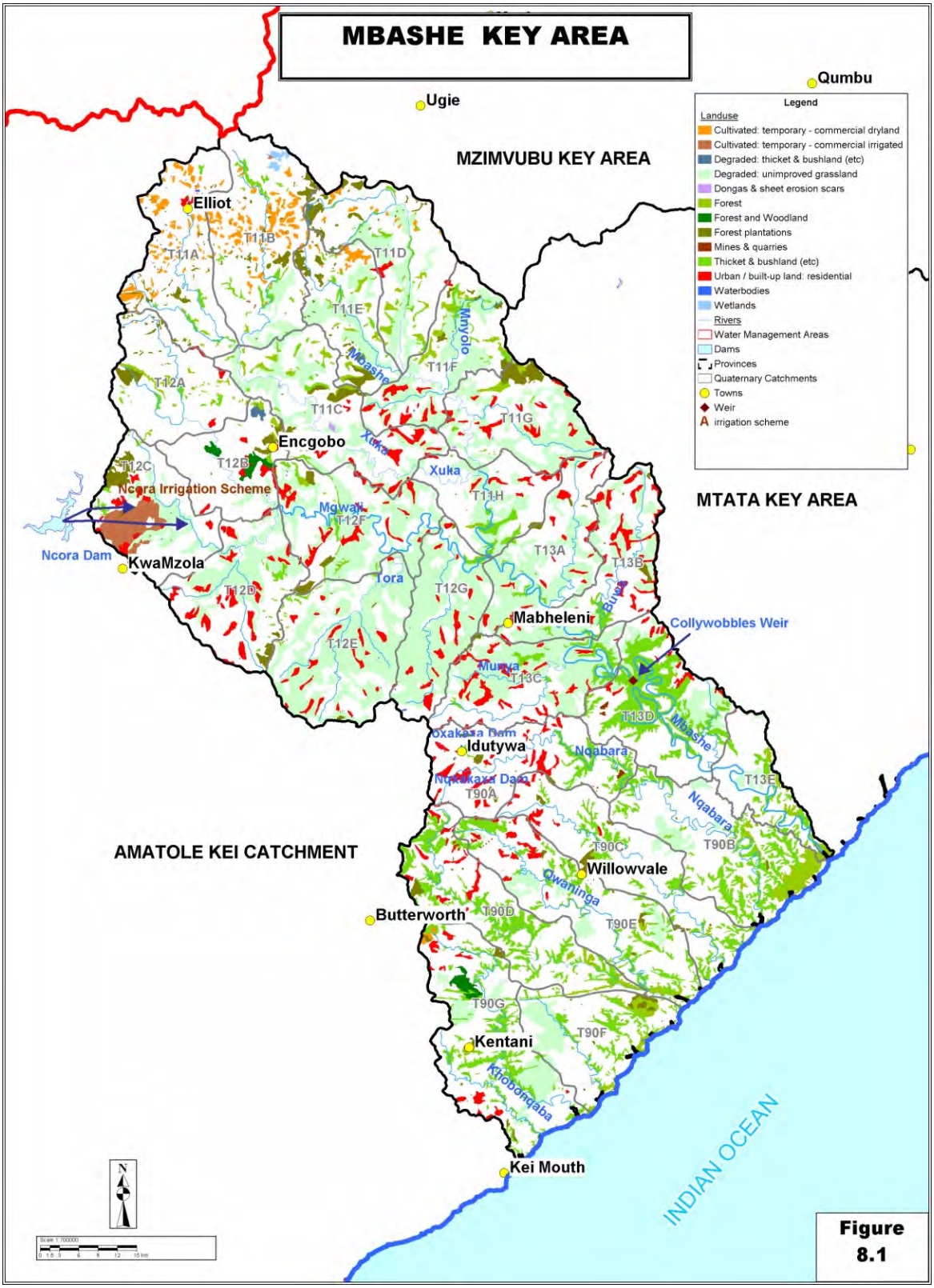
The population of the Mbashe key area is presented in Table 8.1. Approximately 94% of the population live in rural areas. The population is expected to decline in future due to migration and the effects of HIV/AIDS.

Table 8.1: Mbashe key area population distribution

	1995 Population	2025 Population	Average annual growth rates
Rural	547 400	494 400	-0.34%
Urban	32 000	29 200	-0.30%
Total	579 500	523 700	-0.34%

Land-use activities include significant commercial dryland agriculture in the upper catchments around Elliot. The main irrigation development is the Ncora Irrigation Scheme. This scheme relies on the transfer of water (approximately 17 million m^3/a) from the Ncora Dam situated in the Kei River catchment (also refer to the Amatole-Kei ISP report). Commercial forestry has also developed in these catchments, especially since 1990. Because most of the Mbashe key area is rural, much of the rest of the area is used for subsistence farming, cattle grazing and small-scale agriculture, mostly dryland.

The water use of the Mbashe key area is dominated by the hydro-electric power generation at Collywobbles in the T13D catchment, for which between 85 and 102 million m^3/a of water is transferred from the Ncora Dam in the Kei catchment. The Collywobbles hydro-electric scheme makes use of a weir to create the head and to regulate the flow through the turbines. The Collywobbles weir is continuously silting up, and this negatively impacts on the hydropower generation capacity. There is a need to develop operating rules for the apportionment of transferred water between the irrigation scheme and the power station. The DWAF EC Region intends to install a gauging weir to measure the total volumes transferred to the Mbashe River.


MBASHE KEY AREA
Qumbu
Ugie
MZIMVUBU KEY AREA
Legend
Landuse
Cultivated: temporary - commercial dryland
Cultivated: temporary - commercial irrigated
Degraded: thicket & bushland (etc)
Degraded: unimproved grassland
Dongas & sheet erosion scars
Forest
Forest and Woodland
Forest plantations
Mines & quarries
Thicket & bushland (etc)
Urban / built-up land: residential
Waterbodies
Wetlands
Rivers
Water Management Areas
Dams
Provinces
Quaternary Catchments
Towns
Weir
irrigation scheme
Elliot
T11A
T11B
T11D
T11E
T11F
T11G
T11H
T12A
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T12C
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T90A
T90B
T90C
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T90E
T90F
T90G
Mnyolo
Mbashe
Xuka
Encgobo
Ncora Irrigation Scheme
Ncora Dam
KwaMzola
Mqwali
Tora
Mabheleni
Bluba
Collywobbles Weir
Mutiya
Oxakasa Dam
Idutywa
Nqabara
Ntabakaxa Dam
Mbashe
Nqabara
AMATOLE KEI CATCHMENT
Willowvale
Qwaninga
Butterworth
Kentani
Mtholombqaba
Kei Mouth
INDIAN OCEAN
MTATA KEY AREA
N
Figure 8.1

8.3 COMPARISON BETWEEN WATER AVAILABITY AND WATER USE – NWRS VERSUS ISP

The basis of the comparison between the NWRS figures and the information obtained for the ISP on the water availability and use is as discussed in section 4.4.

8.3.1 Comparison of Water Availability – Current Situation

The Mbashe catchment is unusual in that while there is very little development or actual consumptive water use in this catchment, there is a large transfer into the catchment from the Ncora Dam in the Kei River catchment. Most of this transfer is used, non-consumptively, to generate power at Eskom's Collywobbles hydropower scheme.

The remainder of the total transfer is used for irrigation at the Ncora Irrigation Scheme that is located in the upper reaches of the Mbashe River catchment. Although current water use is low because the scheme is not fully functioning, there are plans to revitalise the scheme.

There is a large difference between the local yield of the key area as quoted in the NWRS and the re-assessment conducted for this ISP. This difference is discussed below.

Table 8.2 presents a comparison between the water availability figures in the NWRS and the ISP figures.

Table 8.2: Comparison of the water availability in the Mbashe key area (year 2000) between NWRS and ISP

Yield category	Available water (million m³/a)	
	ISP	NWRS
Gross surface water yield	67	132
Subtract:		
- Ecological Reserve (Impact on yield)	20	20
- Invasive Alien vegetation (Impact on yield)	0	0
Net Surface water yield	*47*	*112*
Ground water	1	1
Return flows	1	1
Net local yield	49	114
Transfers in	102	85
Total available yield	151	199

Since there are no dams of any significance in the Mbashe catchment, the water yield is derived from run-of-river and the transfers in from the Kei River catchment. The run-of-river yield as determined independently in this ISP project using the Rapid Simulation Model, at 67 million m³/a is significantly less than the 132 million

m^3/a published in the NWRS.

A duration curve of the cumulative flows at the mouth of the Mbashe River clearly indicates that the yield could not be as high as 132 million m^3/a. It is believed that the large yield figure in the NWRS comes from the wrongful inclusion of the transfer amount of 85 million m^3/a in the surface water resource yield, resulting in the eventual double counting of the transfer. The lower Rapid Simulation Model figure of 67 million m^3/a was therefore accepted for this ISP report.

The impact of the Reserve on the available yield, as given in the WMA report, has been adopted for this report.

The transfers in include the 85 million m^3/a allocation for Eskom power generation and 17 million m^3/a for Ncora Irrigation Scheme. The NWRS did not include the irrigation water requirement. The two transfers have been included in the total available yield of the key area.

8.3.2 Comparison of water requirements

Table 8.3 presents a comparison of the water requirements between the NWRS and the ISP for the year 2000.

Table 8.3: Comparison of water requirements (year 2000) (1:50 year assurance) between NWRS and ISP

User sector	Requirement (million m^3/a)	
	ISP	NWRS
Irrigation	20	3
Urban	2	2
Rural	6	6
Industrial and mining	0	0
Afforestation	3	0
Total requirement	31	11

The only differences between the ISP and the NWRS figures occur in the irrigation and afforestation sectors. The large difference in the water for irrigation is attributed to the 17 million m^3/a (at 98% assurance of supply) of transferred water used by the Ncora Irrigation Scheme. This allocation was not included in the NWRS. Although the full allocation is not currently being utilised because the irrigation scheme is not fully operational the full allocation is reserved and committed for eventual use by resource-poor farmers. This approach has also been taken up in the development of strategies for the key area.

The NWRS did not consider the impact of commercial forestry. The ISP has included an impact of 3 million m^3/a on the available yield due to the approximately 24 600 ha of commercial forestry located in the upper catchments of the key area.

8.4 WATER REQUIREMENT

Irrigation is limited to the Ncora scheme, with 17 million m^3/a allocated for transfer from the Kei River. The next largest water user is the rural sector, which makes use of run-of-river flows and springs in the upper catchments of the key area.

There is a significant area of afforestation in the Mbashe key area (24 600 ha) and this reduces the runoff by an estimated 19 million m^3/a. The NWRS gives the impact of this on the available yield as zero. This was re-evaluated using the Rapid Simulation Model and the impact on the yield is now estimated at 3 million m^3/a. Table 8.3 lists all the ISP known current (year 2000) consumptive water uses in the Mbashe key area.

8.5 MAIN ISSUES, CONSTRAINTS AND OPPORTUNITIES

8.5.1 Reconciliation of requirements and available water

Based on the figures shown in Tables 8.2 and 8.3 there is a substantial surplus of 120 million m^3/a in the Mbashe key area. This large surplus is largely due to the non-consumptive use of 85 million m^3/a for the generation of hydro-electricity at Collywobbles. This water could be made available for use depending on the pattern of use. Despite the apparent downstream surplus, there are local deficits in the upper catchments (T11) where commercial forestry is prevalent. That deficit has a negative impact on the rural domestic users who depend on run-of-river yield and springs for domestic supply and stock watering. Any further forestry development will increase the impact on those communities unless storage is developed. The other option would be increased use of groundwater and springs.

There are some uncertainties relating to the actual magnitude of the total surplus, which will need to be resolved before making any large-scale allocations for further use. There is also uncertainty regarding the actual volume that is being transferred for irrigation as well as the allocation to Eskom for the hydropower scheme. A strategy has been developed that addresses the water use from the Ncora Dam and this is discussed in detail in Strategy 3.3.

8.5.2 Water quality

The high silt content in surface water creates problems in the Mbashe key area. It is especially problematic for the Collywobbles hydropower plant where the intake works tend to silt up. The high sedimentation rate is exacerbated by over-grazing in the catchment. The strategy for water quality management in the ISP area is described in Strategy 2.2.

8.5.3 Future scenarios

From a water resources perspective no significant changes are expected within the key area in the forseeable future. However, possible major changes in the actual transfer into the key area from the Ncora Dam need to be considered.

Eskom has confirmed that the Collywobbles hydropower station is an important element in the power supply to the Eastern Cape. Water for the power station will continue to be required in future. There is pressure from the Chris Hani DM to make water available from the Ncora Dam for rural requirements but this demand is unlikely to exceed 5 million m^3/a. There is a need to re-assess the yield of the Ncora Dam and to verifiy the transfer requirements in order to establish what surplus would remain for further allocation from the Ncora

Dam. This is discussed in detail in the reconciliation strategy for the Mbashe key area (refer to Strategy 3.4).

8.6 MBASHE KEY AREA STRATEGIC PERSPECTIVES

8.6.1 General

The Mbashe key area is characterised by high natural runoff and very limited consumptive water use. The area presently under irrigation is only about 500 ha which uses an allocation of 17 million m^3/a transferred from the Ncora Dam on the Kei River. There is a significant area of 24 600 ha planted to commercial forests. There are no significant dams in this key area and the available surface water yield is derived from run-of-river. There is also a large transfer (85 million m^3/a) of water into the catchment from the Kei River catchment for hydro-power generation. The potential to use this water consumptively downstream of the power station to create additional economic benefits could be considered.

This surplus, which is mainly downstream of the Collywobbles weir, could be used for:

- Community garden projects
- Small-scale irrigation schemes
- Other productive uses.

The high sedimentation of the Mbashe key area is cause for concern and would need to be taken into account if the construction of any major dams in the key area were to be considered.

The strategy for this key area is first to confirm the volume of surplus water available for future use, taking into account the local deficits in the upper catchments of the key area. Poverty eradication should be the prime focus of such allocations although, due to the lack of suitable soils in the catchment, a productive use other than irrigation would have to be found. Community and commercial forestry is an option, but the potential for expansion of forestry is rather limited.

The following sections provide the major issues and broad strategic perspectives that are specific to the Mbashe key area.

8.6.2 Water Balance and Reconciliation perspectives

There is significant potential for water resource development in the Mbashe River catchment. Some development would be dependent on investments by large anchor projects such as heavy-metal dune mining near the Kei River mouth. There are heavy mineral sand dunes in the lower Centane area. The area has potential for titanium but mining development is on hold for environmental reasons. Any development will require regulation of the water resources from either the Kei or Mbashe rivers. Use of the abundant water resources of the Mbashe River key area should however focus on promoting social equity and poverty eradication.

The water supply scheme at the town of Idutywa does not have sufficient water to meet the RDP standards. Groundwater is a feasible option north of the N2. The Mbashe River is the only feasible source of supply for the southern portions of the Mbashe Local Municipality. The strategic approach regarding sources of water supply to local authorities is as addressed in Strategy 1.4.

There is potential for development of community forestry. There are uncertainties regarding the total water

resources available in the Mbashe key area including the amount of transfer from the Ncora Dam for hydropower generation and the Ncora Irrigation Scheme. A resource availability study is required to determine the actual surpluses before water allocation planning is done. This will also include the verification of existing lawful water use in the key area.

8.6.3 Water Use Management

The Ncora Irrigation Scheme is not fully developed but has infrastructure to support 4 745 hectares. The available water source can only support half of the potential area that can be developed. Supporting factors of production such as water, finance, management support, access to markets and effective institutional support will have to be made available to new emerging farmers.

8.6.4 Water Resource Protection Strategic Perspective

A number of desktop Reserve determinations have been conducted in the Mbashe key area. In the upper catchments, the present ecological states (PES) of the rivers are generally in a C or D category, indicating aquatic ecosystems that are highly modified (DWAF, 2003) [(6)]. This is mostly due to the commercial forestry activities. The recommendations have been to maintain the PES and to protect the resource base from further degradations.

In the coastal rivers of the ISP area the PES is generally in category B which indicates that the river systems are slightly modified. The operation of the Collywobbles hydro-electric power station is causing an alteration of the flow regime of the Mbashe River downstream of the power station. Further development of afforestation will result in further reduction in runoff and this will impact on the ability to satisfy the ecological component of the Reserve. The strategy is therefore to get a balance between resource protection and development to create employment and improve the welfare of communities.

There are a number of springs supplying domestic water to a large number of communities. Most of the springs are situated in low-lying areas where contamination is likely. There have been cholera outbreaks in the upper catchments of the Mbashe key area. A spring-protection programme is required. An inventory of the springs in the Mbashe key area and other current information is not reliable. The data will need to be updated before a detailed spring-protection programme can be implemented.

8.6.5 Water conservation and water demand management (WC/WDM)

There are large water losses in the main urban areas of the Mbashe key area. These include Engcobo, Idutywa and Kentani. Although Water Services Development Plans (WSDPs) describe the need for implementation of WC/WDM measures in the urban areas of the Mbashe key area, they do not clearly highlight the situation with regard to water losses in existing water supply infrastructure and the potential for implementing WC/WDM measures.

The local municipalities use less water than other water use sectors. However, most of the urban areas in the catchment need augmentation of existing water supplies. The proposed strategy is to ensure that the municipalities make more efficient use of available water before new supplies are developed. This will reduce the cost of further water resource development as well as delaying the augmentation of sewage treatment works in towns such as Elliot.

WC/WDM will also indirectly assist efforts to improve the levels of water resource protection (particularly for

the pristine estuaries) in the Mbashe key area. WSDPs should describe the measures required to implement WC/WDM.

The main irrigation scheme in the Mbashe key area is the Ncora Irrigation Scheme. This scheme is not fully developed. Only 25% of the scheme is in operation at present.

There is scope for improved on-farm irrigation water use efficiency. DWAF has upgraded the main conveyance and irrigation distribution system and this is operating satisfactorily.

The strategic perspective for irrigation must include the following:

- Improvement of land tenure system
- Establishment of water user associations
- Strengthening agricultural support services including extension services, and agricultural credit. DWAF can only support and influence these aspects through co-operative governance.

9 GENERAL ISSUES AND STRATEGIES FOR THE MZIMVUBU TO MBASHE ISP AREA

9.1 GENERAL

The key feature that applies across the Mzimvubu to Mbashe ISP area is that it is well-endowed with water. The area has pristine estuaries and other areas of high conservation value (for example the Mkambati Nature Reserve on the Pondoland Coast). Making use of this abundance of water offers opportunities for economic development and with it poverty eradication. Water alone cannot leverage development and other resources such as human, physical and financial as well as institutional and management support must be available to support such developments. These aspects require integrated resource management.

The issues discussed in the following sections are important to integrated water resource management (IWRM), which the DWAF is striving to achieve through the development of the ISP. These general issues and proposed strategies are discussed in this chapter.

9.2 SUPPLY TO LOCAL AUTHORITIES

There are a number of possible future bulk water supply schemes in the Mzimvubu to Mbashe ISP area (see Appendix A13). For the source of supply of these future bulk water supply schemes the focus has been on developing surface water resources from run-of-river yield.

The ISP area has a history of unsuccessful groundwater schemes which has led to negative perceptions around its use. As a result, groundwater is underdeveloped as a domestic supply to rural communities. This source of supply is cheap and sustainable if properly sited and managed. Groundwater resources form an integral part of integrated water resources development planning.

In order to ensure long-term sustainability, the overall strategic approach to the development and management of the water resources of the key area must include conjunctive use of surface and groundwater where feasible to maximise the optimal use of available resources. Local authorities must be encouraged to use groundwater where it is practical to do so. This is the case with Lusikisiki where OR Tambo District Municipality is now investigating groundwater as a source to augment water supplies of the area. The Eastern Pondoland Basin Study identified that development of surface water resources will be expensive and there is significant groundwater potential to meet the future water requirements of Lusikisiki and the surrounding villages.The Department intends to undertake a more detailed study of this possibility.

Where groundwater resources cannot meet the future water supplies of the local authorities, surface water resources can be developed to support the high assurance of supply required for urban use. Development of off-channel storage will be considered favourably such as the one developed in the Mngazi River for Port St Johns.

9.3 FORESTRY MANAGEMENT

A detailed forestry management strategy is described in Part 2 of this report (i.e. Strategy 3.2). The Eastern Cape has 10.7% of South Africa's plantation resource. The contribution of commercial forestry includes:

- 4.4% of the R2.5 billion forest industry market contribution to the GDP
- 1.5% of the R12.5 billion timber products market contribution to the GDP.

Table 9.1 shows the areas under forestry and the impact of commercial forestry in the Mzimvubu – Mbashe ISP area. A Strategic Environmental Assessment (SEA) has been commissioned to determine the desirability, potential, extent and impact of forestry within the entire Mzimvubu-Keiskamma WMA. Much is dependent on markets and the construction of transport links and/or large scale processing plant, with a sawmill in Mtata being a favoured option. There is sufficient water from the Mtata Dam to support such development.

Table 9.1: Forestry areas in the Mzimvubu to Mbashe ISP area

Key-area	Area under forestry (ha)	Potential area (ha)	Impact on yield million m^3/a
Mzimvubu	73 000	15 000	11
Pondoland	11 000	35 000	0
Mtata	170 000	8 000	29
Mbashe	24 600	15 000	3
TOTAL	278 600	73 000	43

There is potential for forestry development in the Mzimvubu to Mbashe ISP area particularly in the Mbashe, Mzimvubu and Pondoland key areas. There is sufficient land and water for forestry expansion in the ISP area.

There are a number of issues hampering forestry development in the Eastern Cape, namely

(i) Lack of access to markets when compared to KwaZulu-Natal Province.

(ii) Environmental impact of forestry development. Despite there apparently being ample water available, there is almost no storage and most users are dependent on run-of-river. During low flow periods, there is competition between the users including forestry and the ecological Reserve. Development of commercial and/or community forests will have a negative impact on the assurance of supply of schemes dependent on run-of-river and may require that some storage be provided to allow for compensatory dry season releases. Other environmental concerns include the loss of grassland. The ISP area has significant cattle farming and the carrying capacity of the land is now being exceeded. Further forestry development will exacerbate this problem.

(iii) The period for processing applications for water use licensing for forestry expansion is lengthy. This is attributed to the requirements for determining the Reserve (DWAF responsibility) and the approval required from the DEAT for environmental authorisation.

(iv) There is lack of finance, skills and expertise to expand commercial forests within the region.

(v) Although there is sufficient water resources and an ideal climate for forestry expansion, there is limitation on the available land for expansion at the economies of scale that are sustainable. Development would mostly be in relatively small pockets.

(vi) Most of the land is communally held and the issues relating to the communal holding and sharing of

forestry plantations have not all been resolved.

9.4 AUTHORISING WATER USE

9.4.1 General Authorisation

The purpose of a General Authorisation is to replace the need for a water user to apply for a licence in terms of the National Water Act for the abstraction or storage of water from a water resource, if the abstraction or storage is within the limits and conditions set out in the General Authorisation.

The present General Authorisation is not key area specific. In the Mzimvubu to Mbashe ISP area there is significant potential for community forestry development. However the present General Authorisation do not specify authorisation for streamflow reduction activities because of the potential environmental impact of forestry development. The General Authorisation allows for a person to "abstract surface water at a rate of up to 25 litres per second:

(a) for the irrigation of up to 25 hectares of land, at 6 000 cubic metres/ ha/a; or

(b) for purposes other than irrigation, up to 100 cubic metres on any given day; and

(c) store up to 50 000 cubic metres of water."

The resources of the Mzimvubu to Mbashe ISP area can accommodate a General Authorisation from a quantity perspective. Development of small-scale irrigation schemes, such as the Mngazi scheme will not cause significant degradation of the resource.

However, the nature of other likely water use, which is expansion of commercial and community forestry (a potential strategy for poverty eradication), will cause resource degradation.

Only the following areas are excluded from the General Authorisation in the Mzimvubu to Mbashe ISP area:

- The T11A and B catchments of the Slang and Xuka Rivers
- T20A & B catchments of the Mtata River upstream of the Mtata Dam
- T35A, B, C, D, F & G catchments of the Tsitsa, Pot, Mooi, Inxu, Wildebees and Gatberg rivers (all tributaries of the Mzimvubu River).

The above catchments are excluded from the General Authorisation, because of the high level of development, which are mainly large-scale commercial forests.

Development of community woodlots have not been identified in the General Authorisation as a water use activity that can be generally authorised. The Mzimvubu to Mbashe ISP area has potential for forestry expansion particularly aimed at community upliftment. Catchment specific General Authorisations would provide an enabling environment for forestry expansion.

The SEA study will assist in identifying where expansion can take place without significant environment degradation and what mitigation measures will be required to minimise environmental degradation. This study should be supported and encouraged.

9.4.2 Water-use licensing strategic perspective

The DWAF Regional Office has received a number of water use licences particularly for community water supply schemes and forestry development in the Mzimvubu to Mbashe ISP area. The licence applications are for both large-scale afforestation and small-scale community woodlots. The key water use licensing issues are as follows:

- The processing of these *ad hoc* licences takes a very long time because of the complex administrative process required for streamflow reduction activities as well as extensive hydrological calculations to be performed. The current process is that when the Regional Office receives the licence application, a request is submitted to the Directorate: Resource Directed Measures to determine the Reserve.
- The Reserve has priority over all water uses and the requirements of the Reserve must be allowed for before any use is licenced. Therefore all water use licensing is conditional on a Reserve determination being carried out and taken into account in determining the water available for allocation.
- Water use for SFRA: The Provincial Department of Environment Affairs (PDEA) is also required to evaluate licences for environmental impacts. The PDEA is not willing to consider wattle. These administrative processes are constraining potential investment and economic development in the Mzimvubu to Mbashe ISP which could be contributing to socio-economic upliftment of the area and poverty eradication.
- Water use for Eskom power generation: The continuing availability of electricity throughout the country from the national grid is essential for both social and economic development. All water which is taken from a water resource for all purposes, or stored, at Eskom power generation facilities is a water use of strategic importance. However the economic value of the power generation facilities in the Mzimvubu to Mbashe ISP area compared with the environmental externalities being caused by these schemes has not been quantified.
- Illegal sand mining: There is illegal sand mining in some coastal rivers of the Pondoland key area. According to section 21 of the NWA this is considered as altering the bed, banks, course or characteristics of a watercourse, and is subject to licensing. The regulations are in preparation, or are contemplated in the near future, concerning altering river banks. The illegal sand mining activities should be regulated in order to avoid further environmental degradation.

The proposed approach to streamlining the administrative process particularly for this ISP area where there are significant surpluses is to do block licensing for streamflow reduction activities. The desktop Reserves should be used to initially determine its impact on the block licences. Further refinement of the Reserve can then be implemented while the licences for poverty eradication development initiatives are considered.

DWAF should engage with Eskom to determine the strategic importance of the power generation facilities in the ISP area.

9.5 WATER MANAGEMENT INSTITUTIONAL ARRANGEMENTS

The Department of Water Affairs and Forestry (DWAF) is the custodian of the country's water resources and

is central to setting the regulatory framework for sustainable water resources management. The Regional Office of DWAF is responsible for managing the water resources in the region. This includes water allocation to water users; managing bulk water infrastructure such as the major dams that are owned by DWAF, monitoring and control of water use and discharge of water containing waste, as well as management of solid waste disposal (see Figure 9.1). The other key function of the DWAF Regional Offices is the management of the commercial and natural forests, which are prevalent in this Mzimvubu to Mbashe ISP area.

The Eastern Cape Regional Offfice of DWAF was actively involved in the provision of water supplies to the rural communities until June 2003, although this had been the function and responsibility of local government. This was because of the significant backlog of providing adequate water supplies particularly to the former homeland areas. The water infrastructure assets that DWAF has are now in the process of being transferred to local authorities as required by Section 78 of the Water Services Act. The main problem is that the Section 78 process is taking long and delaying the transfer of assets. Although the transfer of assets is envisaged soon, DWAF needs to consider the implications of such transfer where the local authorities do not have the capacity to take over the schemes. DWAF must ensure that the transfer of assets include the transfer of not only the personnel to operate and maintain these schemes but also the management capacity of the Water Services Authorities (WSAs) to ensure these assets do not become a liability. Transfer of assets with the financial resources for rehabilitation of the schemes may not be the best approach in the long term because of capcity constraints in local authorities.

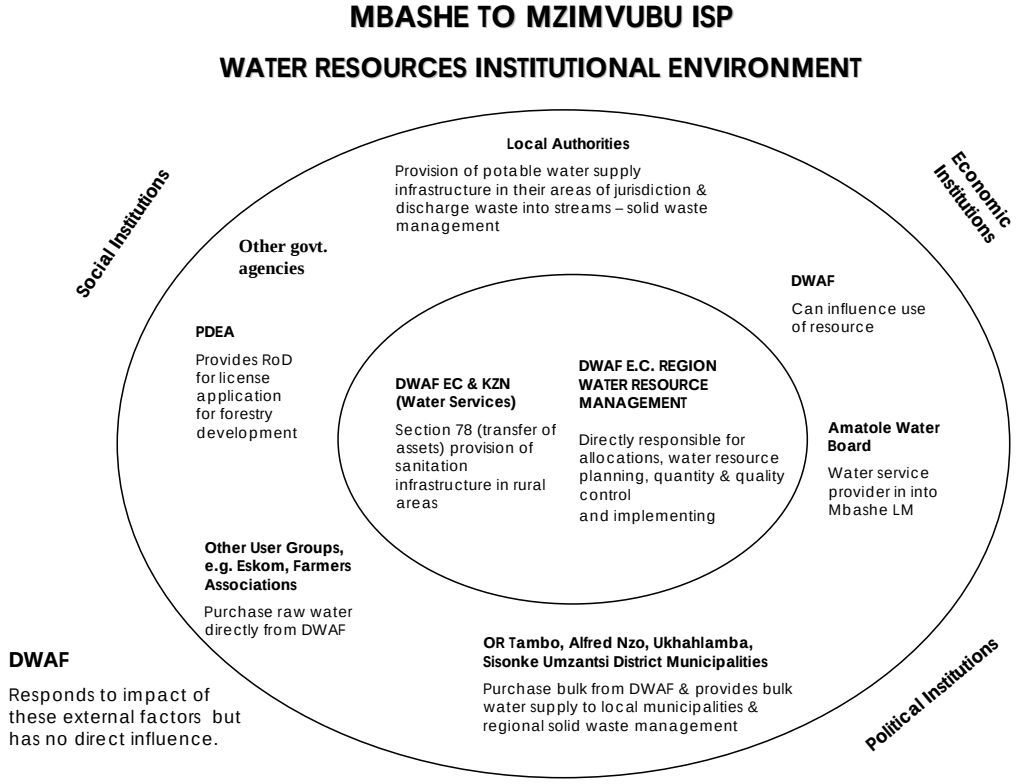


Figure 9.1: Water institutional environment in the Mzimvubu to Mbashe ISP area

9.5.1 Catchment Management Agency–Mzimvubu – Keiskamma WMA

The Mzimvubu to Keiskamma WMA comprises the Amatole – Kei ISP area and the Mzimvubu to Mbashe ISP area. The establishment of the CMA will be for the whole WMA. Although no financial viability study has been conducted for the WMA, the Mzimvubu to Mbashe ISP area is one of the poorest areas. It has a very small revenue base because there are no major industries and the irrigation sector is limited. The main revenue from this area will come from the municipalities and Eskom. The CMA will therefore have to rely on the stronger financial position of the Amatole catchment. The establishment of the CMA cannot be justified on financial sustainability. The establishment of this CMA can only start when there is sufficient cost recovery unless the government subsidises it. This is reflected in the fact that this CMA is expected be the last to be established.

There are stakeholder doubts about the merits and benefits of a CMA for WMA 12. Catchment management charges could be used for cross subsidisation. CMAs are seen as another layer of bureaucratic institution which will not benefit stakeholders.

The strategic approach is for DWAF to demonstrate the importance of decentralising the management of water resources to local level so that issues can be addressed at local level for the benefit of communities in the WMA.

A financial and economic viability study to determine the revenue that can be generated and the administrative costs of operating and maintenance of the CMA must be undertaken.

9.5.2 Water User Associations

The Mzimvubu to Mbashe ISP area is characterised by very few irrigation schemes and related water boards. The main irrigation schemes are Ncora in the Mbashe key area and the irrigation schemes in the Matatiele and Kokstad areas of the Mzimvubu key area. There are no Water User Associations established in the ISP area.

9.6 CO-OPERATIVE GOVERNANCE STRATEGIC PERSPECTIVE

The apparent separate focus and jurisdictions of different Provincial (and National) departments such as DWAF and the Departments of Agriculture, Environment Affairs and Land Affairs is an area of potential conflict. As discussed earlier in Chapter 2, although the Mzimvubu to Mbashe ISP area is largely situated in the Eastern Cape, parts of the Mzimvubu key area is in KwaZulu-Natal. The Sisonke District Municipality falls under the KwaZulu-Natal provincial local government. The situation complicates the management of water resources as the Eastern Cape DWAF Regional Office will have to deal with both provinces on water services issues.

The main co-operative governance issues and proposed strategic approach to addressing them are as follows:

- The main land use is subsistence farming and cattle farming. The carrying capacity for cattle farming is often exceeded resulting in soil erosion. Agricultural practices also result in significant soil erosion. This is increasing the quantities of sediment reaching the Mbashe (as proven by siltation of the Collywobbles weir) leading to loss of storage capacity of the reservoirs and impaired quality of the water resources.

- There is use of marginal land for agriculture, mainly for dryland farming. It is essential that marginal land is not used for agriculture, correct irrigation practices are encouraged and that sustainable rural economic development is achieved through community participation and awareness creation.
- There is very little input from local authorities to ensure co-operative governance is operational. Much more input is needed from the LA's.
- Lack of capacity in all departments hampers effective co-operative governance. The transfer of assets by DWAF should be accompanied with not only the provision of operational capacity through the transfer of staff but also the provision of management capacity.
- A central information system is needed. There is a need for alignment and having an information platform between the DM's and DWAF where programmes from these organisations are available so that an integrated approach to development can take place. There are initiatives to develop such an information platform within the province. This approach will greatly improve co-operative governance between DWAF/CMIP/DM's at all levels in the organizations. CMIP criteria for water supply funding which had been restricting the implementation of properly planned schemes is expected to be resolved through the Municipal Infrastructure Grant (MIG), which will integrate all the funding to local authorities. DWAF's involvement in the MIG is unclear and needs to be clarified.
- Proper planning needs to be done by DM's for water supplies, as this impacts on the water resources including dams. Much effort and financial resources on poor planning of schemes are being wasted at present. This is due to a lack of co-operative governance.
- Water resource protection, particularly groundwater resource protection, and sustainable development will benefit from an alignment of local authority and regional planning with catchment management.
- Co-operative governance is working to some extent in the irrigation sector through the Co-ordinating Committee for Agriculture Water (CCAW).

There is a need for co-operative governance between the Regional DWAF and the various provincial government departments involved in water resource utilisation. Through co-operative governance, DWAF should ensure that all IDPs include soil-conservation measures as well as practical measures for implementing water conservation and demand management. These measures could include contour ploughing, terraces, strip cropping and other techniques that retard overland flow and reduce erosion where dryland agriculture is practiced. Use of irrigated pastures for grazing should be considered to reduce overgrazing which is reducing the vegetation cover in the catchment.

DWAF should embark on awareness campaigns on the impact of soil erosion on the quantity and availability of the water resources of the catchment and also on explaining the exact situation with respect to water supply and availability.

9.7 STAKEHOLDER PARTICIPATION

Water users, water providers and those with an interest in water-related issues such as non-government organisations all have a stake in the decisions that are made in the formulation of the Catchment Management Strategy (CMS), and in the implementation of the identified strategies. Therefore, their

participation in the process of designing and implementing strategies and plans of action is very important. The involvement of stakeholders in the formulation and implementation of the water resources management strategies identified for the key area to address the specific and generic issues, helps in gathering information that will assist in the strategy formulation. Their involvement also creates a sense of commitment or "ownership" that can help to implement the plans of actions and therefore lower the risk of the strategies and plans of actions being unsustainable.

Although the ISP development for the Mzimvubu to Mbashe catchments has been done without the involvement of the other external stakeholders to the DWAF, the institutional stakeholders should now become an integral part of the process for the implementation of the ISP as discussed in Chapter 10. Their involvement during the implementation phase will assist in achieving the following:

- help to gather data or information, identify gaps in data or information and identify new sources of data or information in the future
- provide transparency and accountability regarding both decisions taken and the process by which decisions are taken in the implementation of the ISP
- build a broad base of commitment to options by creating an environment that rewards the realistic discussion of benefits, risks, and costs of options and that provides a meaningful basis for informed consent to recommendations
- lower the risks of implementation of recommendations made for the management of the water resources of the Mzimvubu to Mbashe ISP area. In order to achieve the above aims of stakeholder participation, the plan of action should include at least two activities:

  (i) identifying stakeholders (i.e. people and institutions concerned with or having an interest in water management) that influence or are influenced by decisions on water resource management of the Mzimvubu to Mbashe ISP Area; and

  (ii) securing their participation in the work of developing and implementing a catchment management strategy. There is the substantial risk that involving stakeholders can turn into political conflicts, but if the process is well managed, this risk can be avoided. Strategy 7.1 outlines the situation and the strategic option required to achieve stakeholder participation in the key areas of the Mzimvubu to Mbashe ISP area.

A catchment forum was established for the Mtata River catchment. Other catchment forums should be established in the other key areas to encourage public participation in integrated water resources management.

9.8 MONITORING AND INFORMATION SYSTEMS

The availability of reliable data and information on all aspects of water resources management is fundamental to the success of strategies to implement the NWA. No proper decision on any matter can be made with confidence unless it is supported by reliable, relevant, up-to-date information, which complies with certain standards.

A strategy will need to be developed to collate and develop these systems (see Monitoring and Information Management Strategy No 8). Please refer to Chapter 3: Part 6 of the NWRS for guidance in this regard.

A comprehensive information system is required for the Mzimvubu to Mbashe ISP area, which not only covers the collection and analysis of data, but how it is accessed and disseminated. The need for an information system for these catchments has arisen because of the following:

- The economic values of stream flows are increasing particularly along the coast line to maintain tourism development.
- Environmental and health concerns are increasing in the Mtata River catchments. A database of the health and water quality information is essential for effective management of the resource.
- Effective groundwater management and monitoring is essential for long-term sustainability of the supply and to protect the resource. The NWA requires the Minister to establish national monitoring systems for water resources to collect appropriate data and information necessary for managing the water resources.
- Human resources currently available for monitoring are generally inadequate throughout all existing systems.

The main monitoring and management information issues

- Water Use Monitoring: The information on the functioning of water supply schemes is unreliable and often misleading. There is no validation of the data for the monitoring and evaluation of non-BOT schemes.
- Groundwater Monitoring: There is very little groundwater monitoring taking place in the ISP area.
- Information Management: Monitoring of quantity and quality is not controlled by one section within DWAF. This creates problems because there is no co-ordination. All the monitoring should be under one section in order to streamline sampling of data and processing. DWAF is looking at integrating the Hydrology and Water Management Services sections to improve efficiency in data collation.
- Vandalism of equipment: Vandalism of monitoring equipment is a major problem.
- Data validation: There is no formal data validation process being implemented.
- Management Information System: There is no MIS in the region which integrates the available information systems in the ISP area.
- Database: Data is being gathered by different institutions and departments. There is duplication of effort and confusion as to who the custodian of the information is / should be and how the information can be accessed by ALL institutions.

The strategy for the DWAF is to establish the status of existing monitoring programmes. DWAF must then integrate all monitoring information within the Mzimvubu to Mbashe ISP area as well as the Amatole-Kei ISP area. From a groundwater perspective there is a serious and urgent need to update the relevant database (NGDB). Other databases will also be assessed and update where necessary. The DWAF must then establish a system of data management and identify the organisations responsible for data management. Auditing of

the information is very important in order to ensure the integrity of the information if it is to be useful and relevant.

A database needs to be established / maintained by the responsible management authority, the CMA. This database will record all monitoring data collected in the region. A custodian of the information database is required.

9.9 PUBLIC HEALTH AND SAFETY

The Department's current commitments are associated with the following:

- Managing floods and drought disasters by direct intervention on the ground.
- Reducing pollution and preventing serious or hazardous pollution events.
- Promoting dam safety.

DWAF's (and the CMAs where applicable) commitments under the National Disaster Management Act, which was promulgated in 2002, are:

- DWAF/CMA will be required to support and enforce disaster management planning by all relevant authorities.
- Drafting a National Flood Management Policy (DWAF).
- Dam safety policy (DWAF).
- Co-operating with the Department of Agriculture on drought relief strategies and policy formulation.
- Prevention of pollution of water resources (i.e. limiting health hazards such as water-borne diseases including cholera).

There have been outbreaks of cholera in the upper catchments of the Mbashe and around Mtata.

With the exception of the Mtata Dam there are no major dams in the ISP area. There are therefore no dam safety risks to warrant a strategy specific to the Mzimvubu to Mbashe ISP area.

9.10 WATER PRICING STRATEGY

Chapter 5 of the NWRS outlines the background to the Water Pricing Strategy that DWAF gazetted and which is in force nationally. DWAFs Eastern Cape Regional Office has already levied water resource charges on bulk water users in these catchments.

The Pricing Strategy is intended to achieve the following aspects of water resource management:

- To achieve social equity by setting differential water use charges. This financial assistance (e.g. also to resource-poor farmers) has a sunset clause of five years.
- Finding the direct and related costs of water resources management.
- To achieve compliance with prescribed standards and water management practices according to the "user-pays" and "polluter-pays" principles. DWAF wants to ensure that negative external costs are

internalised.

- Water charges will be used as a means to manage demand in this water scarce country and to encourage reduction in the wastage of water. Provision is made for incentives for effective and efficient water use.

- Non-payment of water use charges will attract penalties, including the possible restriction or suspension of water supply from a waterworks or of an authorisation to use water.

The pricing of water for the Mzimvubu to Mbashe ISP area is mainly centred on provision of raw water supplies to the local authorities and the pricing of water for hydropower generation. DWAF must assess the price for hydropower generation taking into account the negative environmental externalities.

There is a need for the development of wastewater discharge charges particularly for the Mtata key area because of the importance of this if these catchments are to be economically sustainable and viable. A waste discharge charge strategy is currently under development for the country.

9.11 POVERTY ERADICATION

Poverty can broadly be defined in terms of a lack of access to opportunities for a sustainable livelihood. These opportunities can be characterised in terms of income, skills, knowledge, self-confidence and access to capital assets. The Eastern Cape is one of the poorest provinces, particularly the former homeland states of which the former Transkei is situated in the Mzimvubu to Mbashe ISP area. One of the key characteristics of the Mzimvubu to Mbashe ISP area is the abundance of water, a natural capital for contributing to poverty eradication. The availability of water increases the household capacity to combine water with other assets to produce income and create employment opportunities.

The other aspects that are important to contributing to poverty eradication include the following:

- Physical capital: This involves improving the systems to deliver water and to remove the risk and uncertainty of access to water (including maintenance and management of the water). DWAF is rehabilitating the main distribution schemes for the Ncora Irrigation Scheme. However, support is required from the Department of Agriculture to improve on-farm infrastructure.

- Social capital: This requires identification of the poorest households and strengthening participation in, and influence on resource management systems, creating safety-net structures within communities to ensure the poor have access to water.

- Financial capital: This can be secured through small-scale credit to enhance access to water for productive purposes. DWAF has enhanced access to subsidies by the rural poor if they establish Water User Associations (WUA).

- Human capital: One of the key features identified in the case studies conducted for small-scale irrigation systems in the Eastern Cape (e.g. Ncora and Mngazi Irrigation Schemes) is that the average age of people undertaking agriculture irrigation is approximately 70 years (WRC: 2004). Gender mainstreaming is important to improve human capital development.

The four Integrated Sustainable Rural Development Programme nodes cover the bulk of the Mzimvubu to Mbashe ISP area, namely the Alfred Nzo, OR Tambo, Chris Hani and Ukhahlamba District Municipalities,

home to both the deepest poverty and areas of rich natural resources. At least 37 000 hectares can be irrigated from the under-used rivers within the Mzimvubu to Mbashe ISP area, and 73 000 hectares (FEDO: 2002) can be developed for forestry. These figures need to be investigated and confirmed. The SEA study currently in progress should address this issue.

There are other opportunities that can contribute to poverty eradication, such as the area's potential for tourism development. The pristine Pondoland key area can become a major tourist attraction in its own right. Community involvement in tourism should be encouraged.

10 STRATEGY FOR IMPLEMENTATION OF THE MZIMVUBU TO MBASHE ISP

This ISP document recognises that without effective implementation, the best-laid strategies are of little use. Critical to the effective implementation of any strategy is the mobilisation of resources and capabilities within the organisation and/or division assigned the responsibility for implementation of the strategy. This document sees this as part of the development and resourcing of the Regional Office of DWAF. Strategy 9 in Part 2 of this document presents the strategy for implementation of the action plans discussed in this ISP document.

The approach to the development of the Mzimvubu to Mbashe ISP has been based on the understanding that the water resources strategy formulation is primarily concerned with water requirements and availability rather than the organisation of the institutions involved in water resources management. Hence, the focus has been on understanding the water resources issues and the characteristics of the water user sectors (both consumptive and non-consumptive) in the catchments and how the water resources infrastructure is being managed.

The various directorates and regional offices within DWAF identified as responsible for implementing the strategy need to build the strategies into their business plans.

PART 2: STRATEGIES FOR WATER RESOURCES MANAGEMENT IN THE MZIMVUBU TO MBASHE ISP AREA

FORMAT OF THE STRATEGY TABLES

DEVELOPED STRATEGIES FOR ISP AREA

The strategies for the Mzimvubu to Mbashe ISP area have been formulated based on the main strategies and complementary strategies in the National Water Resource Strategy. Specific strategies for the ISP area have been developed under the relevant main strategies. In these strategies the issues and concerns affecting water resource management in each of the key areas of the Mzimvubu to Mbashe ISP area are described and the management actions required also highlighted. The following strategies were found to be relevant for the Mzimvubu to Mbashe ISP area:

Strategy No 1 Resources Balance and Reconciliation Strategies

1.1 Water Resource Availability, Use and Reconciliation for the Mzimvubu key area (T30)

1.2 Water Resource Availability, Use and Reconciliation for the Pondoland key area (T60)

1.3 Water Resource Availability , Use and Reconciliation for the Mtata key area (T20,T70 & T80)

1.4 Water Resource Availability Use and Reconciliation for the Mbashe key area (T10 & T90)

1.5 Groundwater Resource Availability and Use in the Mzimvubu to Mbashe ISP Area

1.6 Water Supply to Local Authorities

Strategy No 2 Water Resources Protection Strategies

2.1 Reserve and Resource Quality Objectives

2.2 Water Quality Management and Pollution Control

Strategy No 3 Water Use Management Strategies

3.1 Schedule 1 Use and General Authorisation

3.2 Implementing SFRA : Foresty Management

3.3 Water use for power generation in the Mtata and Mbashe key areas

Strategy No 4 Water Conservation and Water Demand Management Strategies

4.1 Managing Water Demand in the Water Serices Institutions

4.2 Managing Water Demand in the Irrigation sector

Strategy No 5: Institutional Strengthening and Support

Strategy No 6: Social and Environmental

6.1 Poverty eradication, emerging farmers and revitalising of irrigation schemes

Strategy No 7: Integration and Co-operative Governance

Strategy No 8: Monitoring and Information Management

8.1: Monitoring Networks and data capture

8.2: Information management

The motivation for each of the identified strategies is described in the preamble to the strategies.

ASPECTS ADDRESSED UNDER EACH STRATEGY

The following layout is reflected in each strategy table:

- Management Objective: An understanding of where DWAF wants to be after strategy formulation and implementation.
- Situation Assessment: The management objective of each strategy provides the platform from which to launch an assessment and analysis of issues. This involves identifying, analysing and ranking major water resource issues affecting the key area under discussion. This also examines the physical aspects and wide variety of factors that influence the management of the water resources. This forms the basic platform upon which strategies are formulated.
- Strategic Approach: The intention of this section in the table is to strike a balance between the ideal and the practical choices available to address the issues, which have arisen. This includes developing options and analysing them as far as possible. Based on the situation assessment and a consideration of the ISP area in the light of regional and national water resource objectives, management responsibilities and the approach towards meeting these objectives are recommended. This is intended to offer direction and support to managers in making the decisions required to implement the NWA. The nature of future management actions is guided by the strategic approach.
- Management Actions: In this section of the strategy table, the required activities or work packages to achieve the objective, and the responsible authority, are identified and discussed.

STRATEGY NO 1: WATER BALANCE AND RECONCILIATION STRATEGIES

THE NEED FOR WATER BALANCE AND RECONCILIATION STRATEGIES

The Mzimvubu to Mbashe ISP area is one of the few areas in the country where there is an abundance of water. The ISP area is further characterised by the fact that there is widespread and deep poverty, compared to the rest of the Mzimvubu to Keiskamma Water Management Area (WMA12). The indicators such as literacy levels, unemployment and lack of access to basic and social services confirm this fact. The catchments are deeply rural and there is an urgent need to utilise the surplus water productively and in a sustainable manner to ensure that sustainable livelihoods programmes are developed to meet the socio-economic needs through equitable and fair allocation of the available water.

Water balance and reconciliation strategies address the need to:

- Clarify uncertainties and information gaps regarding the availability of surface water and groundwater.
- Investigate the current water allocations for Eskom, including obtaining more accurate information on the environmental Reserve requirements.
- Determine and implement water reconciliation strategies for specific systems, geographical areas or water sectors.
- Implement compulsory licensing. This is not at present a requirement in this ISP area.

Relevant Identified Strategies

The following specific strategies have been developed:

1.1 Water Resource Availability, Use and Reconciliation for the Mzimvubu Key area
1.2 Water Resource Availability, Use and Reconciliation for the Pondoland Key area
1.3 Water Resource Availability, Use and Reconciliation for the Mtata Key area
1.4 Water Resource Availability, Use and Reconciliation for the Mbashe Key area
1.5 Groundwater Resource Availability and Use in the ISP Area
1.6 Water Supply to Local Authorities

Strategy No 1.1

WATER RESOURCE AVAILABILITY, USE AND RECONCILIATION FOR THE MZIMVUBU KEY AREA (T30)

MANAGEMENT OBJECTIVE

To ensure that the water resources of the Mzimvubu key area, which has very limited storage, are utilised optimally whilst ensuring that the ecological Reserve requirements are met.

SITUATION

A water balance for these catchments and a tabulation of use by the different sectors is provided in Part 1, Chapter 5 of this document. The water requirements of the Mzimvubu catchment are considerably less than the available resource, even after allowing for the ecological Reserve, with the result that there are large surpluses available in this catchment. This is hardly surprising given that the Mzimvubu is South Africa's largest unregulated river with a naturalised MAR of 2 897 million m^3/annum. There are no major dams in this key area but a number of farm dams on the smaller tributaries of the tributaries of the Mzimvubu River. The total surplus for this key area is 50 million m^3 at the year 2000 level of development. Most of this water is from run-of–river yield and is in the lower catchments of the area. There are local deficits experienced in the upper catchments (i.e. T33A–E, T34E, F and T31A-G). These are catchments where commercial forestry takes place.

Consumptive water use in the Mzimvubu key area is fairly limited, with the largest consumptive water user being the irrigation sector, using an estimated 15 million m^3/annum. Most of the irrigation is situated in the Kokstad, Matatiele and Maluti areas.

Rural and urban water requirements make up another 15 million m^3/a. Water shortages are reported in the towns of Kokstad and Mt Fletcher. This is not due to a lack of water resources *per se* but rather due to a lack of infrastructure. The shortage of water in Kokstad due to the construction of the large new prison and the migration of people from the rural areas seeking employment were recently addressed with the construction of an augmentation scheme from the Crystal Springs Dam. The augmentation is for a short to medium term growth in demand. However the yield of the Crystal Springs Dam cannot meet the future water requirements of the town. Additional sources of supply will be required sometime in the future.

There are substantial afforested areas in the Mzimvubu key area, estimated at 73 000 ha, which reduces runoff by an estimated 80 million m^3/annum. The impact of this on the available yield was estimated in the calculation done for this ISP at 11 million m^3/a (refer to Forestry Management, section 9.3).

The water resources of the Mzimvubu key area were last investigated as part of the VAPS Study, 1994 [24] in which potential dam sites were identified for the possible augmentation of the water resources of the Vaal System. However, development of any such scheme would be far in the future. The NWRS has reserved these dam sites for possible

development in the national interest. The potential to transfer surplus water from the Mzimvubu River to the Orange River and hence to the Fish River catchment via the Orange-Fish tunnel is currently being investigated at a reconnaissance level of detail.

Only 45% of the land, which could be cultivated, is being fully utilised in the former homeland areas despite the poverty in the region. Although there is potential for agriculture, there are problems in starting irrigation systems in the key area. Problems experienced include: poor transport infrastructure in the area making access and time to markets difficult; lack of credit as a consequence of communal tenure. There is however potential for additional afforestation in the catchment. A Strategic Environmental Assessment of this catchment to be conducted in 2004/05, will focus on developing the forestry potential of this catchment.

The Mzimvubu catchment has highly erodable soils and suffers from a serious erosion problem, partly due to overgrazing and poor land-use management.

A separate investigation has been initiated by the DWAF after meeting with the Eastern Cape Provincial Government to determine the most feasible ways of utilising the surplus water supplies in the Mzimvubu key area for local economic development and for the benefit of the local communities. The use of the water supplies must take into account the national importance of the Mzimvubu River as a potential source of augmentation of the Vaal River Supply Area.

STRATEGIC APPROACH

A strategy to utilise the surplus water to maximise the benefit to the poor and hence uplift the stagnant economy of the region needs to be developed. As a start an investigation into irrigation and afforestation potential should be initiated but other more innovative solutions may be required, such as high value crops. Any developments must be conducted within the context of the NWRS, which has reserved water for transfer to the Vaal River Supply Area sometime in the future.

A land-use management plan needs to be developed and implemented in the Mzimvubu catchment to limit erosion. This is necessary to, *inter alia,* preserve the viability of potential major dam sites on the Mzimvubu for possible supply to the Vaal System in future. Limiting the number of stock on the land is one possible option and this should be part of a comprehensive land-care management programme.

PRIORITY

Medium to High

	MANAGEMENT ACTIONS	RESPONSIBILITY
1	Notify the relevant authorities such as the CCAW that there are significant water resources available in the Mzimvubu key area, which could be used for irrigation or afforestation in support of poverty eradication projects. The potential for these activities need to be evaluated by others.	DWAF: Regional Office
2	Investigate the future sources of water supply for Kokstad including groundwater and engage with the Local Authority on the future source of supply for the town. Ensure that this is reflected in the WSDP and IDP of Sisonke District Municipality.	

3 Through co-operative governance, address the high levels of erosion in the Mzimvubu catchment by development of a land-care management programme. This management action must be driven by the provincial Department of Agriculture and the local authorities. The IDP's must identify initiatives for land-care management. 4 Align the available water as an input factor of production in order for the Provincial Growth and Development Strategy to be implemented in the Mzimvubu key area as part of rural enterprise development. 5 The water allocation strategy for this catchment is as follows: *Water for poverty eradication/rural supply* Surplus water in these catchments should in the first instance be used for poverty eradication. While in theory there is ample run-of-river water available, the location and magnitude of these surpluses need to be verified before embarking on projects that have large water requirements. *Urban* Urban demands are limited and can be supplied from run-of-river in most cases. Where the assurance of supply is too low, storage can be developed or use made of the ample groundwater in the catchment. *Irrigation* Water for large-scale irrigation use could be made available through the provision of storage. The resource immediately available from run-of-river should be reserved for poverty eradication projects. *Forestry* From a water resource point of view, there is potential for additional forestry in this catchment.	

Strategy No 1.2

WATER RESOURCE AVAILABILITY, USE AND RECONCILIATION FOR THE PONDOLAND KEY AREA (T60)

MANAGEMENT OBJECTIVE

To ensure that the water resources of the Pondoland key area, which has very limited storage, are utilised optimally whilst ensuring that the ecological Reserve requirements are met.

SITUATION ASSESSMENT

A water balance for this key area catchments and a tabulation of use by the different sectors is provided in Chapter 6. The water resources of the Pondoland key area are limited to run-of-river flows which, after allowing for the ecological Reserve, are only just sufficient to meet the small water requirements of the key area. The Pondoland key area is approximately in balance.

The water requirements of the Pondoland catchment are very small and consist mostly of rural requirements, with small urban requirements associated with the coastal resorts. Although there is some 1 000 ha under afforestation in this key area, the area is not large enough to have a significant impact on the water resource.

Lusikisiki and surrounding villages have been experiencing water shortages. The Eastern Pondoland Basin Study identified that there is potential for both surface water and groundwater development to meet the existing and future water requirements of the key area. Further studies are being undertaken by DWAF to verify the most effective source.

There is potential for development of dryland agriculture and forestry in the Pondoland key area. The recently commissioned Forestry SEA will provide a more detailed assessment of where forestry development can take place and what mitigation measures will be required to ensure environmental protection given the high ecological importance and sensitivity of the key area.

The Pondoland key area has been identified for mining of heavy minerals. Although DWAF has not been approached with an application to allocate water for this potential development, the mines should be encouraged to approach DWAF long before water is required. This should be part of the mines' business plans.

There is significant potential for dryland agriculture including dryland sugar along the coast where rainfall is high.

STRATEGIC APPROACH

The strategy is to encourage conunjuctive use of the available groundwater sources to supply the rural requirements, for which there are sufficient resources. The DWAF and OR Tambo DM are currently investigating the groundwater potential to supply Lusikisiki and surrounding communities. DWAF has already investigated the surface water options

and is extending its study to look at groundwater after which recommendations will be made.

Dryland sugarcane might present opportunities in the key area but would require further investigation. The water allocation strategy for this catchment is as follows:

Urban

The urban demands can be supplied from groundwater. Alternatively there are opportunities to provide storage to increase the assurance of supply.

Irrigation

There is no water available for large-scale irrigation use given the high ecological status of the key area although opportunities exist for poverty eradication and small-scale commercial use.

Forestry

There is potential for additional forestry in this catchment but this would need to be carefully evaluated to understand the impact on the ecological Reserve, particularly for the estuaries.

PRIORITY

High to medium

MANAGEMENT ACTIONS		RESPONSIBILITY
1.	Investigate the potential for additional forestry in this key area giving special attention to its impact on the ecological Reserve.	DWAF: Regional Office
2.	Assist OR Tambo DM with the groundwater investigation to augment water supplies to Lusikisiki and the surrounding villages.	DWAF: Regional Office D: Options Analysis

Strategy No 1.3

WATER RESOURCE AVAILABILITY, USE AND RECONCILIATION FOR THE MTATA KEY AREA (T20, T70 & T80)

MANAGEMENT OBJECTIVE

To ensure that the water resources of the Mtata key area are utilised to develop the economy in a sustainable manner for the benefit of communities whilst ensuring that the risk of damaging the resource base is minimised by giving effect to the preliminary ecological Reserve to ensure that ecosystem health is maintained.

SITUATION ASSESSMENT

A water balance for these catchments and a tabulation of use by the different sectors is provided in Chapter 7. The water resources of the Mtata key area are dominated by the Mtata Dam which was constructed primarily for hydro-power generation. After allowing for the ecological Reserve, together with return flows and groundwater the water resources of the Mtata key area are estimated at 146 million m^3/a. This is far in excess of the water requirements, with the result that there is a large surplus in the Mtata catchment.

The water requirements of the Mtata key area, while still small in relation to the available water resource, is greater than the other three key areas put together. The largest water requirement is that of the forestry sector. There is an estimated 290 km^2 of forestry in the Mtata key area which reduces the runoff by an estimated 37 million m^3/annum. All of this forestry is upstream of the Mtata Dam which has a large impact on the yield of this dam, reducing the yield by an estimated 29 million m^3/annum. Urban requirements are also significant, estimated at 15 million m^3/a, mostly required by the town of Mtata. As with the other three key areas, irrigation is very limited in the Mtata catchment, estimated at 293 ha, despite the abundance of water, and it is estimated to use only 2 million m^3/a. Based on the current (year 2000) level of development the Mtata key area has a surplus estimated at 89 million m^3/annum.

The Mtata River Basin Study (DWAF, 2001) [17] estimated that there is potential for an additional 1 200 ha of irrigable land available in the Mngazi and Mtata catchments (downstream of the Mtata Dam) catchments of this key area. The presence of the significant urban population of the Mtata key area creates opportunity for cash crops elsewhere in the ISP area. The potential for high-value crops such as flowers which could be flown out from Mtata is also greater than elsewhere. The potential for additional afforestation in the Mtata key area is limited due to the lack of additional suitable land with sufficient rainfall.

The Mtata Dam supplies water for power generation on the First and Second Falls power stations. Since power production is not a consumptive use of water, it is therefore compatible with use in irrigation, which is required during the winter periods when there is more flow downstream of the dam. The development of irrigation downstream of the Mtata Dam will assist with reducing the winter flows produced by the power stations, which are problematic for the the

ecology of the estuaries.

As with the Mzimvubu key area, the Mtata key area suffers from a serious erosion problem, partly due to overgrazing and poor land-use management. The natural dispersivity of the soil is also a factor. This has a significant impact on the water quality of the Mtata Dam. The Mtata Dam is not silting because the soils remain in suspension.

STRATEGIC APPROACH

The strategy for DWAF is to provide support to the Provincial Growth and Development Strategy to realise its main goal of promoting rural enterprises based on sustainable utilisation of the natural resources and to develop the economy of the ISP area by developing small-scale irrigation projects. The water allocation strategy for this catchment is as follows:

Water for poverty eradication/rural supply

Surplus water in these catchments should in the first instance be used for poverty eradication. While in theory there is ample run-of-river water available, the location and magnitude of these surpluses need to be verified before embarking on projects that have large water requirements.

Urban

Increases in urban demands are expected to be limited but can be supplied from the Mtata Dam. In other smaller urban centres storage can be created or use made of the ample groundwater in the catchment to increase the assurance of supply.

Irrigation

Water for large-scale irrigation use is available through the secondary use of water supplied from the Mtata Dam for power generation. However, the availability of arable land is a serious limitation. The focus should rather be on dispersed small-scale irrigation schemes.

Forestry

From a water resource point of view, there is potential for additional forestry in this catchment, but not upstream of the Mtata Dam.

PRIORITY

High to Medium

	MANAGEMENT ACTIONS	RESPONSIBILITY
1	Notify the relevant authorities that there are significant water resources available in the Mtata key area downstream of the Mtata Dam below the hydropower stations which could be used for irrigation in support of poverty eradication projects. The potential for these activities need to be evaluated by others.	Responsibility: DWAF: Regional Office
2	Inform the authorities of the potential for irrigated agriculture in the Mngazi and Mtata catchments where 1 200 ha was identified during the Mtata River Basin Study with 507 ha available in the Mngazi catchment.	

3	Develop an operating rule for the Mtata Dam that allows for multiple use of the water released for Eskom power generation. As a start an investigation into irrigation potential downstream of the Mtata Dam should be initiated but other more innovative solutions may be required.	

Strategy No 1.4

WATER RESOURCE AVAILABILTY, USE AND RECONCILIATION FOR THE MBASHE KEY AREA (T10 & T90)

MANAGEMENT OBJECTIVE

To ensure that the water resources of the Mbashe key area, which is not highly regulated, are utilised optimally whilst ensuring that the ecological Reserve requirements are met.

SITUATION ASSESSMENT

A water balance for the Mbashe key area and a tabulation of use by the different sectors is provided in Chapter 8. The water requirements are found to be considerably less than the available resource, indicating that there is a large surplus in this catchment. The main reason for this is the large transfer from Ncora Dam on the Tsomo River in the Kei catchment to the Mbashe catchment to generate hydropower. After generating power, this water becomes available for consumptive use.

Consumptive water use in the Mbashe key area is small. The largest consumptive user is the irrigation sector, which has an allocation of 20 million m^3/a, 17 million m^3/a of which is an allocation from the Ncora Dam situated in the neighbouring Kei River catchment. Rural water requirements, which include stock watering, are estimated to be 6 million m^3/a while urban water use is 2 million m^3/a. There is a significant amount of forestry in the upper catchments of the Mbashe key area, estimated at 246 km^2 which reduces runoff by an estimated 19 million m^3/annum. The impact of this on the available yield is limited to only 3 million m^3/a.

There is a large non-consumptive use by Eskom for generating hydro-power. Water is transferred into the Mbashe catchment from the Ncora Dam in the Kei River catchment for this purpose. The NWRS quotes a transfer of 85 million m^3/a but there is some uncertainty as how much is actually allocated to Eskom or what agreements they have with DWAF on the control of this use. Although this water use is non-consumptive, the monthly distribution of this use needs to be understood better in order to ascertain how much of this can be used by other sectors situated downstream of the hydro-power stations. The impact of this large transfer on the riverine ecology is also an issue that needs to be addressed. This is discussed in Strategy 2.1.

The local water resources of the Mbashe key area have never been analysed in detail. The resource was assessed as part of this ISP and estimated at 47 million m^3/a at a 98% level of assurance. There are no significant dams in the Mbashe key area and the yield available is all from run-of-river flow. In addition to this, the water transferred from the Ncora Dam for hydropower generation becomes available for secondary use after its primary use for power generation.

The potential for additional irrigation appears to be limited due to the poor soils and the steep terrain, but this needs a more thorough assessment in the light of the availability of water. There is however also potential for additional

afforestation in the catchment.

STRATEGIC APPROACH

There is clearly a lot of surplus water available in the Mbashe catchment from the non-consumptive water downstream of Collywobbles hydropower scheme. A strategy to utilise this water to maximise the benefit of the local populace and hence uplift the stagnant economy of the region needs to be developed. As a start an investigation into more innovative irrigation methods and afforestation potential should be conducted.

The availability of water, through the secondary use of the water used by Eskom to generate hydro-power, needs to be better understood and more accurately quantified. Alternative options for the use of this water also need to be investigated. It needs to be ascertained whether the transfer from the Ncora Dam could not perhaps be better utilised in the Kei River catchment (for poverty eradication) than for power generation and subsequent irrigation in the Mbashe catchments. This will mean reallocation of water. Eskom will need to be consulted in this regard and their strategy regarding the hydro-power generating potential in the Mbashe River understood and taken into consideration.

The allocation of the surplus water can be done for the following uses in this catchment:

Water for poverty eradication/rural supply:

Surplus water in these catchments should in the first instance be used for poverty eradication. This is readily available in large quantities downstream of Eskom's hydro-power plant. The availability of water upstream of these facilites would require more detailed analysis.

Urban:

Urban demands are limited and can be supplied from run-of-river in most cases. Where the assurance of supply is too low, storage can be developed or used conjunctively with groundwater in the Key area.

Irrigation:

Water for large-scale commercial irrigation is certainly available in the Mbashe catchment and this in itself could be a viable poverty eradication strategy through job creation. The availability of suitable arable land and access to markets is however a serious limitation. High-value crops such as flowers are an option but this would require large capital investments.

Forestry:

From a water resource point of view, there is potential for additional forestry in this catchment.

Mining:

Potential for mining of the dunes is also believed to exist in this key area. Recent investigations by TICOR assumed that water for this would be sourced from the Kei River by building off-channel storage.

PRIORITY

Medium to High

MANAGEMENT ACTIONS		RESPONSIBILITY
DWAF needs to undertake the following management actions:		Responsibility:
1.	Confirm the allocation to Eskom for the transfer from the Ncora Dam. This is crucial in order to confirm how much is available for secondary use after the power generation. DWAF has installed a gauging weir to facilitate measurement of the transfers.	D: NWRP
2.	Investigate the availability of the water resources downstream of the Eskom power generation plants in close co-operation with Eskom.	DWAF Regional office
3.	The revitalisation of the Ncora Irrigation Scheme is receiving attention but will require ongoing attention, particularly the institutional, land tenure, and extension services.	DWAF Regional Office
4.	Notify the relevant authorities that there are large water resources available in the Mbashe key area which could be used for irrigation or afforestation in support of poverty eradication projects. The potential for these activities need to be evaluated by others.	D: NWRP
5.	Investigate the ecological impacts of the increased river flows associated with Eskom's hydro power generation in the Mbashe River and develop operating rules to mitigate these impacts, especially on the estuary.	D: RDM

Strategy No 1.5

GROUNDWATER RESOURCES AVAILABILITY AND USE IN THE MZIMVUBU TO MBASHE ISP AREA

MANAGEMENT OBJECTIVE

The purpose of this management strategy is to ensure the conjunctive use of surface water and groundwater, in order to optimise resource use in a sustainable manner within the ability of communities to pay for services received. The purpose is also to ensure that the different aquifers/wellfields/boreholes have appropriate operating rules and management plans that are reviewed and revised on the basis of the monitoring information. Operating rules must fulfil the legal requirements and be based on a reliable and quantitative understanding of the aquifer(s) and surface-groundwater interactions.

SITUATION ASSESSMENT

As indicated in Table 3.1 in Chapter 3, there are a number of the towns and villages whose sources of water supply are mainly from either groundwater or springs. The bulk of the current groundwater usage is from the primary aquifer in the Cedarville (T31F) area of the Mzimvubu key area. No aquifer specific numbers are available at present. There is limited use from coastal aquifers in the Mbashe key area (T90) but no usage figures are available. There is limited abstraction from the Karoo aquifers (Katberg Dolerite and regolith).

Regionally there are four key aquifer systems in this WMA. These are:

(1) large-scale alluvial aquifers underlying the flood plains below the headwaters of the Mzimvubu River extending to the Towns of Cedarville and Matatiele (T31 and T33, Mzimvubu key area);

(2) Msikaba fractured rock aquifer between Port Edward and Lusikisiki (SE Pondoland key area);

(3) Dolerite dykes and sills throughout the ISP area; and

(4) Katberg fractured rock aquifer in the western sector of the Mbashe key area (limited recharge area, within a rain shadow and storage limited as strata thin towards the east, water quality considerations).

The Mtata DWAF office is largely responsible for the monitoring and regulation of groundwater usage in this ISP area. There is dwindling supervision capacity and function in District Municipalities. The problem is two fold: lack of capacity within DWAF and the local authorities.

There is a lack of groundwater database management because of capacity constraints within the DWAF RO.

Lack of capacity to run urbanized centres and manage change from rural settlement to small towns present a major pollution and supply threat to groundwater and surface water.

STRATEGIC APPROACH

The following strategic approach is envisaged:

- ❑ To highlight the major benefits of groundwater use in terms of rural well-being and income and to raise awareness of the ivarious important linkages between groundwater and rural development. This strategy identifies appropriate technical and institutional approaches to improve the operational reliability of boreholes and the resource sustainability of aquifers in the context of rural development.
- ❑ To build the knowledge and understanding of groundwater and human resource capacity within DWAF to manage groundwater in this ISP area.

PRIORITY

High to medium

MANAGEMENT ACTIONS		RESPONSIBILITY
1.	Develop a database, information and guidelines for management and protection of different aquifers and as input to activities of other directorates and District and Local Municipalities.	Responsibility: DWAF: Regional Office
2.	Develop a springs protection programme for the ISP area in order to manage and protect the available resource.	
3.	Determine how much groundwater is available and where.	
4.	A better action would be to undertake an assessment study to determine the *status quo* of the locations, conditions and yields of selective boreholes which are able to give insights into aquifer behaviour.The outcome of the study would be the “Design and implementation of an integrated groundwater development plan”.	

Strategy No 1.6

WATER SUPPLY TO LOCAL AUTHORITIES

MANAGEMENT OBJECTIVE

The objective of this management strategy is to ensure that water services authorities are aware of their sources of water supply in their areas in order to optimise the development and use of these resources. Where surface water is difficult to access and in short supply the use of groundwater is encouraged, often conjunctively with existing surface water supplies.

SITUATION ASSESSMENT

The water supply situation in most of the towns in the ISP area is currently adequate with exceptions described under each key area below (also refer to the Table 3.1 in Chapter 3 of Part 1).

Studies such as the Mtata River Basin Study and the East Pondoland Basin Study investigated water supplies to local authorities in the Mzimvubu to Mbashe ISP area. These studies included identification of future sources of water supply to the coastal towns in order to ensure that tourism development in areas like the Pondoland would not be restricted. Studies have also been undertaken by DWAF under the Build operate train and transfer (BoTT) programme to implement water supplies to many rural villages and towns in the ISP area.

Since the establishment of District Municipalities (DMs) as Water Service Authorities (WSAs), investigations for additional or new water supplies to local authorities have been undertaken by the District and Local Municipalities (LAs) using technical advisors (consulting engineers). In most cases the capacity and water management expertise in the DM's and LM's is insufficient. When requested, DWAF regional office staff has assisted municipal officials in compiling acceptable programmes and plans. DWAF has even seconded its own staff to the local authorities. The technical manager for OR Tambo Municipality was employed by the DWAF Regional Office and then seconded to the District Municipality.

In many cases unacceptable proposals for water supply options are often recommended for implementation by municipal officials i.e. there is often insufficient raw water resources available or there are competing interests requiring water from the same source. This only becomes known when applications are made to DWAF for water licences. This gives the appearance that DWAF are delaying what are often seen as urgent and necessary water supply schemes and leads to misunderstanding and a breakdown in co-operative governance.

The IDPs and WSDPs in most local municipalities have not been completed. Until these documents are completed to an acceptable level of accuracy and detail, the information regarding the anticipated future water requirements and sources of supply for local authorities remains uncertain. Support requested and given by DWAF at the initial stages of compiling the WSDP's would overcome many of the problems encountered with the WSDP's to date. Often the fault lies with inexperienced consultants appointed by the LA's.

Many LA's obtain all or a portion of their water requirements from schemes which they now own and operate. Appendix A provides the existing water supply schemes in the ISP area. The LA's are often unaware that they must

WATER SUPPLY TO LOCAL AUTHORITIES

consult with DWAF, as the government department responsible for the management of the water resources, before making or approving recommendations regarding changes to increases in water supplies. In addition, there is often a general lack of capacity within many LA's to participate and to take responsibility for their mandate. The following water supply problems have been identified:

Mzimvubu key area

Kokstad – Water shortages experienced in the town of Kokstad were addressed by the constructon of an augmentation scheme from the Crystal Springs Dam (Ninham Shand, 2004) [27]. The town's current source of supply is from springs and the Crystal Springs Dam situated in the Mzintlava River. As discussed in the groundwater strategy (Strategy 1.5), large-scale alluvial aquifers underly the flood plains below the headwaters of the Mzimvubu River in the Cedarville and Matatiele area and can augment future water supplies to Kokstad if it is determined to be technically feasible and economically viable.

Port St Johns – The town of Port St Johns is very important from a tourism perspective. It is situated in the heart of Pondoland where there are express aims to develop the tourism potential of the area. There were increasing water shortages in the town because of the growth in tourism that is taking place. A new off-channel storage scheme in the Mtata key area is currently under construction to augment water supplies of the town and the surrounding communities.

Maclear – The source of water supply for the town is the Maclear Dam. The yield of the dam is small and cannot meet future water requirements of the town. However from the overview there seems to be potential for groundwater development to supplement the current source of water supply to Maclear.

Mtata key area

Mhlanga – The source of water supply for the Mhlanga Water Treatment Works is the Mhlanga Dam. The dam has a small yield with a storage capacity of 0.78 million m^3/a. The regional water supply scheme supplying the rural villages upstream of the Mtata Dam has been expanded and additional sources of supply are required. There are plans to utilise the existing Nqadu Dam which is currently not being utilised to supplement the water supplies of the Mhlanga Water Treatment Works.

Mhlahlane Water Supply Scheme – The Mhlahlane Water Supply Scheme is currently reliant on run-of-river as the source of supply for the treatment works. There is however a registered but unused water allocation for the scheme from the Mabeleni Dam which is not being utilised. Future augmentation of the water treatment works can therefore come from the Mabeleni Dam. The dam has a yield of 1.73 million m^3/a at 1:50 years assurance of supply.

WATER SUPPLY TO LOCAL AUTHORITIES

Mbashe key area

Engcobo – The town of Engcobo relies for its water on two streams with a combined 1:50 year yield of 0.21 million m^3/a. The water treatment works has a capacity of 0.95 Ml/d or 0.29 million m^3/a. The town has a population of 11 000. The available resource is inadequate for the requirements of the town which is a busy regional centre. This is mainly due to the commercial sector and industries in the town. The following issues and concerns have been identified:

- There is continued urbanisation in this ISP area particularly migration of the rural population in search of employment opportunities in such towns as Mtata. Water requirements are growing in most towns, even though overall populations are not increasing or are even declining in the rural areas. Services have been upgraded in most small towns under the CMIP programme which has now been replaced by the Municipal Infrastructure Grant (MIG) programme.
- DWAF and the recently appointed District and Local Municipalities are still developing relationships and hence do not yet have information sharing and co-operative governance structures in place.

STRATEGIC APPROACH

The approach will be:

- ❑ To work with and inform LA's, of where their future sources of water supplies will be.
- ❑ To promote up-front liaison and agreement between DWAF and LA's regarding proposed developments as mentioned in the WSDP's.
- ❑ To promote awareness within LA's of the need to involve DWAF in their plans and to consult DWAF before making recommendations. The WSDP's should be informed by the NWRS, ISP and Catchment Management Plans. WSDP's should highlight water conservation and demand management measures proposed by the LA's in addition to current sources of supply and future anticipated sources of supply. Future planning should consider applicable social, environmental and economic impacts and costs.

The RO will identify outstanding WSDP's and ensure that they are submitted timeously. The RO must review IDP's, WSDP's and Water Sector Plans and provide feedback to the relevant LA's to ensure that proposals conform to DWAF requirements. IDP's and WSDP's must become the documents that reflect the total municipal water strategies.

LA's should be encouraged at every available forum, committee or other venues jointly attended by DWAF and LA's to first pursue alternative augmentations options, such as water demand management, effluent reuse, water trading or eradication of invasive alien plants in water stressed areas before applying for additional surface or groundwater use. Where future water supplies have not been identified in the WSDP's, further feasibility studies must be undertaken by the LA's. An approach and strategy for water supply must be developed for each town.

DWAF is committed to assist with building capacity at District and Local Municipality level although this is constrained by the limitations of its own capacity.

WATER SUPPLY TO LOCAL AUTHORITIES	
PRIORITY: Priority 1 – Very high.	
MANAGEMENT ACTIONS	RESPONSIBILITY
1. The RO must review the WSDP's and follow up with LA's in cases where submissions are incomplete or have not been submitted. The RO must pro-actively assist the LA's with regard to development of water supply schemes and water demand management investigations and implementation programmes. 2. The RO must review the yield of the dams supplying the towns of Kokstad and Maclear, to determine how much additional water is required taking into account implementation of Water Conservation and Demand Management measures in these towns. 3. Request the Directorate: Water Use Efficiency at DWAF Head Office and the regional water conservation and water demand management division to assist LA's with the capacity to develop business plans required for the implementation of WC/DM strategies. 4. Establishment of a spring inventory and management of the springs is essential for the towns and villages dependent on spring supplies to avoid contamination. 5. Aim to improve borehole monitoring.The Directorate: Information Programmes and the RO Hydrological Information Sub-Directorate must investigate this and compile a strategy to deal with the situation. 6. Co-ordinate with the OR Tambo, Ukhahlamba, Alfred Nzo and Sisonke District Municipalities regarding further studies into future water supply options for the ISP area.	All Directorates in DWAF Regional Office

STRATEGY NO 2: WATER RESOURCE PROTECTION STRATEGIES

THE NEED FOR WATER RESOURCE PROTECTION STRATEGIES

The Water Resources Protection Strategy addresses the need for the protection of water resources to ensure their continuing availability for human use by leaving enough water of appropriate quality in rivers and streams to maintain their ecological functioning. This will be achieved by:

- Classification of the water resource systems and determination of their human and environmental Reserves.
- Setting the Reserve and the Resource Quality Objectives of these water resource systems.
- Addressing water quality management, pollution control and sanitation.
- Addressing pollution sources.

Water required for socio-economic growth must be balanced with the availability of water that is fit for use by all users, including the protection of the aquatic ecosystem. The NWRS defines two complementary approaches for the protection of water resources. Resource Directed Measures focus on the character and condition of the in-stream and riparian habitat, whilst Source Directed Controls focus on the control of water use at the point of potential impact, through conditions attached to water use authorisations.

These strategies aim to achieve adequate protection for surface and groundwater resources in order to reach a balance between protection and sustainable use.

Relevant Identified Strategies

The Classification System is still being developed. Therefore the class of the water resource systems for the Mzimvubu to Mbashe ISP area cannot yet be determined as required by the Act. The following specific strategies are developed further:

2.1 Reserve and Resource Quality Objectives

2.2 Water Quality Management and Pollution Control

Strategy No 2.1

WATER RESOURCES PROTECTION STRATEGIES

RESERVE AND RESOURCE QUALITY OBJECTIVES

MANAGEMENT OBJECTIVE

The objective of this management strategy is to ensure that the resource base is not allowed to deteriorate to a level from which it cannot recover in order to maintain the ecosystem health and function of the resource for sustainable provision of goods and services.

SITUATION ASSESSMENT

A number of desktop Reserve studies have been conducted for this ISP area. These determinations were triggered by the many licence applications received by the Regional Office for Streamflow Reduction Activities. These determinations are provided in Appendix A14.

Mzimvubu key area

In the upper catchments of the Mzimvubu River there are a number of significant wetland areas. These wetlands have been damaged by construction of roads and agricultural practices in the area. An inventory of the wetlands in the Eastern Cape is being developed. The Working for Wetlands programme needs to ensure that the significant wetlands in the ISP area are protected from the developments and agricultural activities by determining the water requirements and the Resource Quality Objectives (RQOs).

Pondoland key area

The coastline of the Mzimvubu to Mbashe ISP area is renowned for its beauty and the potential for ecotourism development, particular along the Pondoland coast. According to the desktop Reserves this area is of high ecological importance and the Present Ecological State (PESC) has been categorised as shown in Annexure A14. Pondoland development initiatives have been investigating anchor projects to open the coastline for tourism development. The proposed N2 toll road is one such anchor project.

In order to ensure the area is preserved, the ecosystem structure and function of the rivers passing through the Mzimvubu to Mbashe ISP area (particularly the key areas of Mzimvubu and Pondoland) must be maintained. The estuaries in this ISP area are considered pristine and their maintenance requires a balance between the freshwater and seawater for the biota and habitat to be maintained.

Mtata key area

During the Mtata River Basin Study (DWAF 2001), the preliminary Reserve of the Mtata River as well as the

RESERVE AND RESOURCE QUALITY OBJECTIVES

estuarine water requirements were determined. Although the PES for the upper Mtata River was found to be in a D category, the estuaries were driving the high environmental water requirements of this key area. The PES of most of the estuaries in this key area is in a C state, requiring more freshwater to be available from the river at the appropriate time and in the right pattern. It was identified that the operation of the hydropower scheme on the First and Second Falls dams was affecting the ecosystem function of the Mtata River. This is due to the time distribution of the water, which is now available in winter, and there is less water available in summer. The Resource Quality Objectives of the rivers particularly the Mtata and Mbashe rivers, need to be developed in order to manage source directed control measures.

Mbashe key area

The present ecological state of the Mbashe river in the upper catchments was determined as a D category. This is due to non-flow related aspects such as land use and overgrazing. The forestry in the upper catchments (T11) also has had a significant impact on the low flows and therefore the ecological functioning of the upper Mbashe river system. The matter is further affected by communities dependent on run-of-river yield. The recommendations from the desktop Reserve study are to maintain the D category which represents the level of protection beyond which the reliance of the resource base will be exceeded.

The operation of the Collywobbles hydro-electric power station is affecting the flow regime and the ecological functioning of the biota in the Mbashe River. Expansion of afforestation will result in a reduction in runoff and the impacts thereof on the ecological component of the Reserve, particularly in the estuary that is considered pristine has to be taken into consideration in balancing development with resource protection. Afforestation development will also impact on run-of-river users such as the town of Engcobo.

General environmental issues

During the summer period, there are enough grazing areas for the stock. During winter farmers do not sell their stock and the carrying capacity of the land is limited. This will result in overgrazing, erosion and a further loss of the carrying capacity. The above non-flow related activities have an impact on the quality of the resource. The RQOs of all the rivers in the Mzimvubu to Mbashe ISP area have not been set because of the absence of the class of the resource. Only ecological specifications (commonly known as ecospecs) were set for the Mtata key area. These need to be monitored in order to ensure that the Threshold of Probable Concern (TPC) is not exceeded.

In the absence of a classification system, the class of the water resources of the Mzimvubu to Mbashe ISP area have not been determined to balance the objectives of ecological (resource protection), social (equity) and economic sustainability. However, the preliminary determinations of the ecological component of the Reserve have been done for the various *ad hoc* licence applications, particularly for streamflow reduction activities in the ISP area.

Although the preliminary Reserves have been determined in a number of the catchments, a concern is that these preliminary Reserves are not being implemented. This is effectively defeating the objective of protection of the resource base for sustainable ecosystem function. Section 13 of the Act requires that the Reserve be given effect to once it has been determined or an implementation strategy for the Reserve is in place.

RESERVE AND RESOURCE QUALITY OBJECTIVES	
Implementation of the Reserves can be done if the yield impact of these Reserves have been determined and the users in the catchment are informed as to how much water (either as flow or as depth) should be left in the river at the different abstraction points. There is a need to set licence conditions in order to ensure that resource protection can be done. The tools and processes for implementing the ecological Reserve have not been well developed.	
STRATEGIC APPROACH The strategic approach for resource protection of the Mzimvubu to Mbashe ISP area is to consider all aspects of the river and drainage system in their context. This means looking at the ISP area from its headwaters to the estuarine and coastal environments including wetlands and associated groundwater systems. Given that the area has high levels of poverty, this means considering environmental, economic, social and cultural values in relation to the entire Mzimvubu to Mbashe ISP area. A wide range of outcomes, from resource protection to serving the socio-economic development needs of communities are to be considered in setting the Reserve and the Resource Quality Objectives.	
PRIORITY Low to Medium	
MANAGEMENT ACTIONS	RESPONSIBILITY
1. Identify clear objectives for setting the environmental flows as well as water abstraction and use in order to balace resource protection and sustainable utilisation.	D: RDM
2. Identify rivers and estuaries of high ecological importance and sensitivity and develop the Resource Quality Objectives for the entire Mzimvubu to Mbashe ISP area with particular attention to the receiving quality objectives of the Mtata River.	D: RDM
3. Identify the tools and develop the processes and mechanisms for implementation of the preliminary Reserve. The current assurance rules tables should be simplified to allow the personnel in the RO to be able to use the results not only for considering licences but also to set the licence conditions, thereby giving effect to the Reserve.	D:RDM
4. Develop a manual for implementation of the preliminary Reserves and build capacity within the RO.	D:RDM
5. DWAF must set a monitoring programme to determine whether the threshold of probable concerns (TPCs) set to achieve the RQOs are not being exceeded.	D:RDM
6. DWAF must prioritise the estuaries in terms of the ecological importance. The high priority estuaries must be protected and monitored.	D:RDM

RESERVE AND RESOURCE QUALITY OBJECTIVES		
7.	Undertake comprehensive Reserves for the rivers and estuaries as determined by the national priorities.	D:RDM

Strategy No 2.2

WATER RESOURCES PROTECTION STRATEGIES

WATER QUALITY MANAGEMENT AND POLLUTION CONTROL

MANAGEMENT OBJECTIVE

The objective of this management strategy is to address the water quality concerns of the Mzimvubu to Mbashe ISP area through preventive actions to address point and non-point source pollution to ensure the protection of the downstream users, including the ecology.

SITUATION ASSESSMENT

The water quality of the Mzimvubu to Mbashe ISP area is naturally of good quality. However there is potential for pollution of the good water quality because of the following:

- Agriculture: Overgrazing in the ISP area is causing large silt loads. There is limited irrigation in the area and therefore there is no serious problems for now.
- Rural Population: The majority of the population in the Mzimvubu to Mbashe ISP area are located in the rural areas. There are no proper sanitation infrastructure in most of the rural villages which leads to pollution of the sources of supply and a high risk of waterborne diseases. The situation will improve once the huge backlog on the sanitation infrastructure and proper water supply schemes have been dealt with. Where the source of supply is groundwater, there is a need to ensure that the recharge capture areas are adequately protected.
- Urban areas: The biggest problem in the urban areas is that the sanitation systems do not cope with the densely populated areas. This results in untreated sewage ending up in streams on which downstream communities are dependent for their source of supply.

The following are typical water quality problems found in the Mzimvubu to Mbashe ISP area. The investigations of the Mtata River Basin Study (DWAF, 2001) identified that the water quality immediately downstream of the Mtata Dam and below the town of Mtata was poor and deteriorating (see Appendix A5). The situation is not only prevalent in the Mtata River. Water quality problems have also been identified in other areas such as Mngazi, Lusikisiki and Port St Johns. There are three main reasons for the deteriorating water quality situation. These are:

(i) Overflow of untreated sewage into the Mtata River. There are capacity problems with the existing sewage pump stations to handle the additional amount of sewage generated since the construction of the Nelson Mandela Hospital in Mtata.

WATER QUALITY MANAGEMENT AND POLLUTION CONTROL

(ii) Lack of sanitation infrastructure in rural and informal settlements in the catchments. This situation is very serious in the informal settlements around Mtata. Some of these informal settlements are situated within the flood line of the Mtata River, increasing further risk of human loss in times of floods.

(iii) Soil erosion is a major problem in the whole ISP area.

The impacts of these factors are discussed below.

- Discharge of untreated sewage and storm-water runoff into rivers: The discharge of untreated or inadequately treated sewage from the Mtata Prison and the town of Mtata into the river because of the inadequate capacity of sewage treatment works and sewage pump stations has significantly contributed to the deteriorating water quality problems in the rivers. Untreated effluent is discharged into the Mtata River, causing a health risk to downstream communities who use the water. It also settles into the First Falls and Second Falls dams, enhancing eutrophication with resulting undesirable algae growth.

  In addition to the untreated sewage runoff, stormwater runoff from Mtata has been found to cause pollution problems in the Mtata River as a result of the following processes:

  - Growth of the towns – Mtata, and to a lesser extent the other towns, have been growing rapidly because of the urban-pull effect of the rural population seeking employment. As the towns have grown the new areas and the peri-urban areas have either been connected to old sewer systems or not connected to any sewer system at all. The old sewer systems have inadequate capacity and may overflow during heavy rainfall as a result of stormwater infiltration, resulting in polluted stormwater flowing into the rivers. Where residential areas are not connected to sewer systems and effective alternative sanitation systems are not provided, human waste collects on the ground and pollutes the water flowing over the ground during heavy rainfalls. This has increased runoff of poor water quality into the Mtata River and other rivers in the area.

  - Wash-off from impervious areas – In the case of Mtata the impervious areas comprising streets, sidewalks and parking lots generate significant quantities of runoff when it rains. This water (particularly the first floods) runs off into the Mtata River through the stormwater drainage system. The runoff picks up oils and bacteria, which have detrimental effects on the aquatic life of the river due to their toxicity and on humans using the water for cooking, washing and drinking.

  - Dense rural and informal settlements along the banks of the Mtata River - There are a number of dense informal settlements along the banks of the Mtata River without any formal sanitation infrastructure. Because of lack of proper sanitation facilities, there are high nitrate concentration levels in the river water downstream of these settlements. A study undertaken by the University of Fort Hare for the Water Research Commission (WRC) clearly showed high counts of faecal coliforms and ammonia, which indicated the presence of pathogenic bacteria in the Mtata River. The pathogenic organism of chief importance in water-borne diseases is Salmonella typhosa, and studies have shown that there is a direct relationship between coliform

WATER QUALITY MANAGEMENT AND POLLUTION CONTROL	
organisms and S. typhosa. • Soil erosion problems - The Mtata River catchment contains areas of extensive erosion where the loss of topsoil has been caused by rain and wind erosion that has occurred because of the topography and the human settlement pattern. Most of the soils eroded end up in the rivers, increasing the turbidity of the water in the rivers. The geological formations typically give rise to dispersive soils, which remain in suspension and do not settle in dams such as the Mtata Dam. The extent of soil erosion can be seen in the upper catchments of the ISP area because of the steep topography and high rainfall. The land use pattern as indicated in Chapter 3 is also increasing the soil erosion through overgrazing and subsistence agriculture in the highly populated upper and central areas of the catchments. Vegetation has become very sparse where there are human settlements, especially in the dry period of the year. This means there is no protection of the soil from erosion when the first rainfalls occur each year. The land-tenure system that is prevalent in the ISP area creates problems as well, as it makes it difficult to apply grazing management systems and good farming practices. The impact of soil erosion on the raw water quality increases investment costs and the cost of operation and maintenance of water treatment works in towns like Mtata and Mqanduli. The extent of the problem is mainly centred in the upper and central catchments of the ISP area. There are a number of springs supplying domestic water to communities in the Mbashe key area. Most of the springs are situated in low lying areas where contamination is likely. However it is only when cholera outbreaks occur that springs are protected. A proactive spring protection programme is urgently required.	
STRATEGIC APPROACH Water quality needs to be managed with the same attention as quantity in the ISP area where in many instances the water quality issues are more urgent. Whilst there is an urgent need for monitoring, the serious water quality issues already identified must be given immediate attention. The strategic approach that DWAF needs to take is to ensure pollution control at the source and develop source directed control measures for the ISP area. Priority should be put on the Mtata River which is being severely impacted with the potential of serious health consequences. DWAF needs to engage the local authorities and all relevant agencies responsible for water quality problems experienced in the area.	
PRIORITY - Very high	
MANAGEMENT ACTIONS	RESPONSIBILITY
(i) Determining the water quality objectives for rivers such as the Mtata because of the direct downstream use of the river for drinking purposes by communities living near the banks of the river. (ii) DWAF should improve on cooperative governance actions but where this is	Regional Office Water Quality Management

WATER QUALITY MANAGEMENT AND POLLUTION CONTROL		
	failing consider remediation and legal measures where the responsible local authority has not met the required standards for effluent discharges. Identify the constraints in the local authorities and through co-operative governance assist in capacity building of the institutions discharging waste in the ISP area to ensure proper operation and maintenance of the existing wastewater treatment plants.	DWAF: Regional Office
(iii)	Urgent development of a spring protection programme for the ISP area.	DWAF: Regional Office
(iv)	Develop and implement a strategy of education and training to protect borehole head areas from water spillage, damage by cattle drinking, etc. Position new boreholes well away from settlements, and pipe water to the settlement, where the groundwater resources are suitable to do this.	DWAF: Regional Office
(v)	DWAF must encourage regional solid waste management for the ISP area with transfer stations from other areas such as Port St Johns, etc.	Regional Office and Dir: WDD
(vi)	Motivate for the Mtata River to be a listed water resource in the General Authorisation for discharge to comply with special limit values.	DWAF: Regional Office

STRATEGY NO 3 – WATER USE MANAGEMENT STRATEGIES

THE NEED FOR WATER USE MANAGEMENT STRATEGIES

Chapter 4 of the NWA describes the provisions by which water use may be progressively adjusted to achieve the Act's principle objectives of equity of access to water, and sustainable and efficient use of water. Many of the Act's sustainability and efficiency-related measures would be applied through conditions of use imposed when authorisations to use water are granted. Formal water use authorisations will also facilitate administrative control of water use by water management institutions, and will form the basis upon which charges for water use may be made, and provide for the collection of water-related data and information.

Until compulsory licensing is introduced, the existing water use control measures need to be strategically implemented to provide a means of reducing the number of authorisations that require processing under the existing arrangement. This is done through a General Authorisation and Schedule I use. The protection of the water resource must not be compromised through the modification of existing controls.

The Water Use Management Strategy may be required to address:

- Management of Schedule 1 water use.
- Management of water use in river basins shared with other countries.
- Usage of General Authorisations to manage water use.
- Verification of existing water use and its lawfulness.
- Processing and issuing of new water-use authorisations.
- Control of invasive alien plants and weeds.

10.1 RELEVANT IDENTIFIED STRATEGIES

The following specific strategies have been developed further for this ISP area:

3.1 Schedule 1 use and General Authorisations and licences for water use

3.2. Strategy for Stream Flow Reduction Activities in the Mzimvubu to Mbashe ISP area

3.3 Water use from Ncora Dam to the Mbashe key area.

Strategy No 3.1

WATER USE MANAGEMENT STRATEGIES

SCHEDULE 1 USE AND GENERAL AUTHORISATIONS AND LICENCES FOR WATER USE

MANAGEMENT OBJECTIVE

The objective of this strategy is to ensure that the current processes and mechanisms of issuing a license are streamlined so that existing and potential users can have access to the surplus water resources of the area with minimal administrative burden.

SITUATION ASSESSMENT

General Authorisations (GAs) are a tool in the WMA aimed at reducing the pressure on the need to issue individual licenses. All water use needs to be registered and ultimately licensed – but the NWA recognized that this could place an impossible or unnecessary burden on the regulatory authorities, especially in cases where there were many applications for new uses, and little doubt as to the acceptability of the water use, and therefore the issue of the licence.

The General Authorisations is therefore aimed at allowing some category of new users to commence with that use without having to apply for a licence – provided that use is within the scope and limitations of the General Authorisation. The user must still register that use, but it is automatically legal under the GA process and does not need special approval. Typically GAs are available for the taking and storage of water up to a certain limit per user – and these GAs are declared for areas where there may be plenty of water and no question of overuse, or where storage of water may provide no foreseeable threat to the resource. GAs may also be declared to allow the discharge of waste water (again very strong conditions will apply,) and most recently a GA has been published to allow for the modification of stream banks without the specific need for a licence under certain conditions. (A strict reading of the NWA otherwise requires, for example, that every stream culvert must be individually licensed).

GAs were, until 2004, handled as a national function and determined and gazetted centrally, although local input was obviously important. This situation has now been rationalized, a recognition both of the value of the GA as a tool, but also of the importance of and revising all GAs finely, frequently and at local scale. GAs can be proclaimed for very specific needs in very specific places. GAs are now reviewed at the level of the WMA authority (currently the Region) and may be at quaternary or even finer scale and changed annually or even more frequently if required. It is, indeed, extremely important that all GAs are regularly reviewed. As soon as there is any indication that the resource needs to be brought under tighter control then the GA should either be rescinded or modified. It is up to the Region to keep track of the situation and to motivate such modifications as required.

It must be noted that a water use under a GA (provided that use is registered) carries the same authority as use

SCHEDULE 1 USE AND GENERAL AUTHORISATIONS AND LICENCES FOR WATER USE

under licence. Note that (a) the GA may be modified and this will affect new users but will not affect the rights of users who commenced that use under the GA in force at the time, and (b) any exceedance of the conditions of use under the GA will constitute illegal use.

GAs are not available for Stream Flow Reduction Activities (SFRAs). The reason for this is primarily because the control and licensing of forestry is a co-operative governance function and cannot be authorized only under the NWA. In practice the water-use aspect could be allowed for under a GA but there is little point in this given that any application must be considered and evaluated by all co-operative governance partners. The mapping of suitable areas for forestry with mapping outlining areas where water, environmental and agricultural constraints have all been suitably accounted for, is the closest that forestry has come to a GA. Such a map has been produced for communal land in southern KZN but this process has not yet been followed in the Eastern Cape.

In the Mzimvubu to Mbashe ISP area a GA allows for a person to "abstract surface water at a rate of up to 25 litres per second for:

(i) the irrigation of up to 25 ha of land, at 6000 m^3/ha/a, or
(ii) purposes other than irrigation, up to 100 m^3 on any given day; and
(iii) store up to 50 000 m^3 of water".

Despite the overall abundance of water the following areas were excluded from this GA in the Mzimvubu to Mbashe:

- T11A and T11B (Slang and Xuka river catchments)
- T20A and T20B quartenaries in the Mtata River, upstream of the Mtata Dam
- T35A,B,C,D,F and G being the catchments of the Tsitsa, Pot, Mooi, Inxu, Wildebees and Gauteng Rivers

All of these catchments were excluded from the relaxation allowed by the GA because of the high level of development, primarily commercial forest plantations, which limits the available resource in these catchments. (In other words care must be taken with regard to the issue of all further water-use licenses in these quaternary catchments).

There is a lack of access to information by the deeply rural communities of the Mzimvubu to Mbashe ISP area on the opportunities that are available to them to utilise water under the General Authorisation. In most of the small irrigation schemes visited, the farmers are not aware of their rights to water as well as subsidies available to emerging farmers under the NWA.

The revised GA provides the listed water resources where discharge of waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit, in accordance with Section 21 (f) and (h), is excluded. In the Mzimvubu to Mbashe ISP area the following are listed water resources:

- Xuka River to the Elliot district boundary
- Tsitsa and Inxu rivers to their confluence
- Mvenyane and Mzimvubu rivers from sources to their confluence
- Mzintlava River to its confluence with the Mvalweni River

SCHEDULE 1 USE AND GENERAL AUTHORISATIONS AND LICENCES FOR WATER USE	
A number of issues arise from the revised GA with particular reference to resource protection as required by the Act. The GA does not distinguish between instream storage and off-channel storage as the impacts on the resource are quite different. Instream storage will have significant impact on the floods and freshets which will be required by the ecology. This has not been dealt with in the GA Notice No. 399. The GA also allows for the construction of structures across a watercourse if it does not occur within a distance of 500 m upstream and downstream of other structures. This can have a serious ecological impact as can be seen in the Komati system where several weirs have been constructed in series. This has changed the lower Komati system into a canalised system. A GA should be catchment specific in order to cater for local conditions and not be too generic.	
STRATEGIC APPROACH The majority of the communities in the Mzimvubu to Mbashe ISP area use small quantities of water which falls under either Schedule 1 or the General Authorisation. The strategic approach for DWAF is to provide information to and to create awareness among the communities on the procedures for authorising water use and the process of General Authorisation.	
PRIORITY Very high	
MANAGEMENT ACTIONS (i) DWAF must through the CCAW undertake an awareness campaign on the availability of water under General Authorisation. DWAF should undertake a public participation process to create awareness and educate communities on how they can utilise the available water resource. (ii) As part of the SEA study investigate the feasibility of quaternary-wide allocation of licences for Stream Flow Reduction Activities focused on developing community forestry.	RESPONSIBILITY DWAF Regional Office

Strategy No 3.2

WATER USE MANAGEMENT STRATEGIES

IMPLEMENTING SFRA - FORESTRY MANAGEMENT

MANAGEMENT OBJECTIVE

The objective of this strategy is to balance forestry development and management with the need for water resource protection for sustainable ecological functioning in order to achieve socio-economic objectives and eradicate poverty that are evident in the Mzimvubu to Mbashe ISP area.

SITUATION ASSESSMENT

The Eastern Cape holds 10.7% of South Africa's plantation resource, contributing:

- 4.4% of the R2.5 billion forest industry contribution to the GDP
- 1.5% of the R12.8 billion timber products contribution to the GDP

Although not contributing significantly to the GDP, the Mzimvubu to Mbashe ISP area has however been identified to have significant potential for forestry development, approximately 73 000 ha. The potential for further forestry development, namely in the key areas of the Mzimvubu to Mbashe ISP area is further supported by the significant amount of surplus water that is not currently being fully utilised. Recently DWAF's Forestry Enterprise Development Organisation (FEDO) identified priority quaternary catchments for forestry development where the determination of preliminary Reserves is required. The following estimate is made of the potential forestry development in each of the key areas of the Mzimvubu to Mbashe ISP area:

Pondoland key area: There is approximately between 15 000 to 35 000 ha of afforestable land in the whole T60 secondary catchment comprising the key area. SAPPI has identified outgrower projects. There are also a number of communal schemes identified in this key area, particularly along the coast.

Mzimvubu key area: Between 2 000 and 6 000 ha of afforestable land in T32G near Mt Ayliff and T33H and J (between Mt Frere and Flagstaff) has been identified. There is high potential for afforestation although the economies of scale limit commercial development of forestry.

Mtata key area: Approximately 2 000 to 6 000 ha of potential afforestable land was identified in this key area primarily in the vicinity of Libode, and a request for the determination of the preliminary Reserve was made to the Directorate: Resource Directed Measures.

Because the ISP area is the poorest compared to the rest of the Mzimvubu to Keiskamma WMA there is justification for developing commercial and community woodlots to contribute to economic development of the

IMPLEMENTING SFRA - FORESTRY MANAGEMENT

area and thereby contribute to poverty eradication. The area also has a population which is deeply rural and lacks access to resources.

The main constraints affecting expansion of the forestry can be summarised as follows:

The need to conduct an environmental impact assessment by the provincial DEAET in order to determine the long-term viability of forestry development. There is significant potential for the expansion of forestry in the coastal areas of the ISP area but the environmental impact of this development needs to be carefully assessed and mitigation measures identified. There is a need to ensure co-operative governance between the relevant institutions regarding environmental impact assessments and the granting of licences for SFRAs.

Water Use Licensing – for each licence application DWAF requires that a preliminary Reserve is determined before the licence can be considered. The determination of the preliminary Reserve has been largely blamed for the delay in issuing licences even for community forestry because the process takes a long time. It has been established however that the main reason for the delay in Reserve determinations is due to the lack of capacity both within the Region as well as the Directorate: RDM to conduct some of the Reserve determinations. Although the time required to conduct a Reserve determination using the Rapid method requires only 2 days, the procurement process takes two to three months to outsource the specialised services required to conduct the determination of the preliminary Reserves.

Road Infrastructure – There is a lack of sufficient road infrastructure to carry the timber to the sawmills.

Lack of access to finance and markets - There is sufficient land & water for expansion of the underdeveloped forestry sector. However there is not sufficient critical mass to create the economy of scale required to attract markets.

Land tenure - Most of the available land is tribal land. Although DWAF has no direct influence on the tenure system, the contribution of water as an input for production can be constrained by the land-tenure system that is not conducive to attracting access to finance because of lack of collateral. It is understood however that the National Department of Land Affairs and the Provincial Government are in the process of addressing the land-tenure system in order for communities to use land as collateral to have access to capital.

In order to overcome the above constraints, the Provincial Government has established the Transkei Rapid Impact Programme (TRIP) (PGDP; 2003) as a vehicle to expand forestry production by support to small-scale saw millers to improve security of supply and to upgrade technology and marketing. 50 000 hectares of individual and community woodlots are planned for development integrated with the development of a chipping mill. This initiative will require DWAF support in ensuring that the available surplus water and the administrative procedures for considering licence applications are streamlined. A process is now in place between the Provincial DEAT and DWAF to fast-track the granting of a record of decisions and the approval of licences for the investment in forestry expansion to take place.

IMPLEMENTING SFRA - FORESTRY MANAGEMENT

STRATEGIC APPROACH

Forestry is very important in this ISP area. There is significant potential for forestry development in the ISP area. Forestry will create jobs and generate wealth. It will also be able to act as a catalyst for rural development thereby reversing the migration of the rural population to urban areas in search of jobs.

Forestry and especially community forestry, appears to be one effective way of utilising surplus water in the Mzimvubu to Mbashe ISP area to good use. However development of commercial forestry plantations makes demands on the base flow and this can be in conflict with the objectives of water resource protection to sustain ecological functioning of goods and services from the rivers. There will be a need to balance resource protection with development for the benefit of communities through equitable distribution of the resource.

The Department is supporting a Strategic Environmental Assessment to confirm that allocations of water to forestry meet social, ecological and economic concerns in the short to long term.

The approach is currently based on the understanding that there is sufficient water to support very significant areas of forestry, although catchment-specific investigations (quaternary catchment scale) will always be required to ensure that the Reserve and specific needs of local communities are not unduly impacted.

Given that most land is communally held, most of this forestry (and its water allocation) will be in the hands of rural communities.

PRIORITY

Very high

MANAGEMENT ACTIONS		RESPONSIBILITY
(i)	DWAF must continue to engage with the Eastern Cape Provincial Government on the proposed developments as part of the Integrated Sustainable Rural Development nodes of OR Tambo, Chris Hani and Ukhahlamba District Municipalities and inform the province of where the surplus water is available.	Directorate: NWRP
(ii)	Assess the impact of SFRA's in the Mzimvubu to Mbashe ISP area on the base flow of the water resource systems through the SEA process that is currently being conducted. multi-objective criteria for decision making to achieve social (equity and poverty eradication), and economic development of the ISP area and resource protection through giving effect to the Reserve and setting the Resource Quality Objectives of the river systems, must be developed as part of the SEA process.	DWAF: Regional Office Forestry Management
(iii)	DWAF should communicate the findings of the SEA projects to the Province with regard to potential areas for forestry expansion where the environmental impacts will be minimised or could be mitigated.	
(iv)	Maintain the continued co-operative governance between DWAF and the	

IMPLEMENTING SFRA - FORESTRY MANAGEMENT	
DEAT to facilitate and speed up the granting of licences for SFRAs where appropriate for economic growth and employment creation.	

Strategy No 3.3

WATER USE MANAGEMENT STRATEGIES

USE OF WATER FOR POWER GENERATION IN THE MTATA AND THE MBASHE KEY AREAS

MANAGEMENT OBJECTIVE

The objective of this strategy is to assess the beneficial use of water transferred from the Ncora Dam in the Amatole Kei ISP area into the Mbashe key area to support hydropower generation and irrigated agriculture. This strategy will investigate the business case for the intra-water management area transfer compared to the utilisation of the water supply in the Upper Kei catchments (refer also to the Amatole-Kei ISP report).

SITUATION ASSESSMENT

In terms of Chapter 4 section 37 of the National Water Act (Act No 36 of 1998), the use of water by Eskom for hydropower generation alters the flow regime of a water resource and has been declared a controlled activity.

Eskom has hydro-electric power schemes that are located in the Mzimvubu to Mbashe ISP area (see Appendix A10). These are described below.

Collywobbles hydro-electric power scheme

This hydro-electric power scheme is situated in the Mbashe River. The scheme has a generating capacity of 14 MW. The scheme can be upgraded by an additional 14 MW generating capacity. The load factor for the scheme is 30%. Collywobbles requires approximately 2.96 million m^3 per GWh generating capacity.

The source of water for power generation is the Ncora Dam situated in the Upper Kei River catchment. It is estimated that approximately 85 million m^3/a is transferred from the Ncora Dam for the purposes of generating power at Collywobbles. However this figure is only an estimate and the actual volume that is transferred and the pattern of transfer is not well understood. A gauging weir has now been constructed to measure the volume that is transferred. The yield of the Ncora Dam is also not certain (refer to the Amatole-Kei ISP report). Eskom has a weir at Collywobbles which provides the head to generate the electricity. The weir is now silting up because of upstream soil erosion. The future of the scheme is therefore being affected. Discussions with different business units in Eskom have indicated that there are uncertainties about the future of the Collywobbles hydro-electric scheme.

The Collywobbles hydro-electric power scheme supplies peaking power to the Eastern Cape. Its advantage is that as a hydro-electric plant on standby it can be put into operation at short notice.

The operation of Collywobbles to meet peaking power in the region means that the water is released for power generation during winter periods. This is in direct conflict with the pattern for maintaining a sustainable

USE OF WATER FOR POWER GENERATION IN THE MTATA AND THE MBASHE KEY AREAS

ecosystem structure and function. The ecology requires water during the summer months and less water during winter months. The impact of the reversal of flows has not been quantified, not only in ecological terms, but also its influence on the tourism potential of the key area, and particularly on the estuary.

Ncora Dam is also the source of water supply for the Ncora Irrigation Scheme situated in the Mbashe Key area. The main issues and concerns with the intra-water management area transfer from the Ncora Dam to the Mbashe key area can be summarised as follows:

- The actual amount of transfer from the Ncora Dam is unknown.
- There is an increasing demand for the water from the Ncora Dam from the communities situated downstream of the dam in the Tsomo River.
- The weir at Collywobbles is silting up and affecting the generating capacity of the hydro-electric scheme. The future of the scheme is uncertain and Eskom has not clearly stated whether it will continue operating the scheme.
- The current flow pattern is causing ecological damage; the impact is not well understood. The ecological importance of the downstream reach should be compared with the value of water for power generation to ascertain the negative externality caused by the power generation and whether there is merit in continung with power generation.

Power generation from the Mtata River

Power generation at Mtata requires approximately 5.4 million m^3 per GWh. The analysis carried out during the Mtata River Basin Study indicated that the power stations can operate with an average load factor of 15% which is annually distributed to give more power during the summer months (5% load factor) and less during the winter months (5% load factor). Because of this operation, there are high flows during the winter months and low flows during summer. This situation is opposite to the natural flow conditions and has an impact on the natural functioning of the ecosystem of the Mtata River.

The benefit from hydro-electric power generation was estimated in the Mtata River Basin Study at R2.5 million/a at an average energy charge of 11 cents/kWh. The value of power generation is relatively low and it is unlikely if a better high-value user such as municipal or irrigation for high value crops could be identified.

STRATEGIC APPROACH

The strategic approach for the above issues and concerns is to unpack the opportunities and constraints of use of water in the Mbashe key area. There is a need to develop a clear strategy and agreement between DWAF and Eskom on the licence for hydropower generation at both Collywobbles and First and Second Falls.

PRIORITY

High

USE OF WATER FOR POWER GENERATION IN THE MTATA AND THE MBASHE KEY AREAS		
	MANAGEMENT ACTIONS	RESPONSIBILITY
(i)	DWAF must as a matter of urgency determine the allocation from Ncora Dam for hydropower generation at Collywobbles.	Directorate: NWRP
(ii)	DWAF must engage with Eskom on the future of the hydropower schemes in the ISP area.	D: NWRP
(iii)	Based on the future of the scheme, DWAF must review the water allocation to Eskom in terms of its high priority as a strategic user and licence conditions	Directorate: Water Use
(iv)	DWAF should determine the pricing of water for hydropower generation based on the pricing strategy.	Directorate: Water Use
(v)	An assessment of the yield of the Ncora Dam needs to be done and the increasing water use downstream of the Ncora Dam factored into the volume to be transferred.	DWAF RO with assistance from NWRP
(vi)	If Eskom wants to increase the generating capacity by 14 MW then the application for a licence should be considred only if an impact assessment of the change in flow on the ecosystem functioning and the long-term sustainability of the resource base is undertaken.	Directorate: RDM

STRATEGY NO 4 - WATER CONSERVATION AND WATER DEMAND MANAGEMENT

THE NEED FOR WATER CONSERVATION AND WATER DEMAND MANAGEMENT STRATEGIES

The options for further augmentation of water supplies by developing new physical infrastructure are becoming increasingly limited and expensive. As a result more attention is being placed on managing the demand for water, encouraging its efficient and effective use, and reducing losses in supply systems. This requires the creation of a culture of water conservation and water demand management (WC/WDM) amongst individual users and within all water management and water services institutions.

The National Water Conservation and Water Demand Management Strategy is based on the premise that many water users can maintain their quality of life and achieve the desired outcomes from their water use, whilst using less water. Furthermore significant reductions in water use can be achieved by changes in behaviour and the adoption of water-saving technologies. DWAF will continue to encourage all water users to voluntarily comply with water conservation and demand management principles and strategies.

Whilst water is relatively abundant in the Mzimvubu – Mbashe ISP area the principles and practices of WC/DM remain very important. DWAF has a clear policy that efficient use of existing water supplies must be implemented before new sources of supply are developed.

The Water Conservation and Water Demand Management Strategy is required to address the urban, agricultural and industrial sectors.

RELEVANT IDENTIFIED STRATEGIES

The following strategies form part of this overall strategy:

4.1 Managing Demand in Water Services Institutions

4.2 Managing Demand in the Irrigation Sector

Strategy No 4.1

WATER CONSERVATION AND WATER DEMAND MANAGEMENT STRATEGIES

MANAGING DEMAND IN WATER SERVICES INSTITUTIONS

MANAGEMENT OBJECTIVE

The objective of a demand-side management strategy is to make more efficient use of the existing available water resources to the domestic and industrial sectors before consideration is given to the development of expensive alternative sources of supply.

SITUATION ASSESSMENT

Significant water losses and water wastage are known to occur in Water Services Institutions of the Mzimvubu to Mbashe ISP area. The WSDPs that have been developed by the Local Authorities have not demonstrated that existing water supplies are being use efficiently and there is no scope for managing demand. The focus of most of the WSDPs in this ISP area has been on supply- side management.

The two studies commissioned in the area, namely the Mtata River Basin Study and the Eastern Pondoland Basin Study, did not investigate the water-use efficiencies and water losses in the various water-user sectors like the irrigation sector, electricity generation, etc. in order to determine whether there were issues in this regard and whether there is scope for managing demand and conserving water. Preliminary investigations indicated that there are high quantities of unaccounted for water in Mtata. This may be due to the poor state of repair of the water supply infrastructure and meter-reading errors in the town. As a result, the unit operating costs for the water supply have increased because the water losses do not generate revenue. The situation assessment study conducted by the Regional Office of DWAF for the town of Mtata identified that there are high quantities of unaccounted for water losses in the town, estimated at 51%. As a result of wastage in the town the wastewater treatment works are being overloaded because about half of the total supply into the town is not used and some of the water ends up as wastewater. This results in inefficient and inappropriate allocation of financial resources.

At a meeting of the Mtata Catchment Forum, other towns such as Nyandeni were also identified as having high quantities of unaccounted for water and high per capita consumption.

The effect of inefficiency of water use and high water losses on the water resources will be the need to augment the source earlier than would be absolutely necessary. The headroom of most of the water supply schemes in the Mzimvubu to Mbashe ISP area indicate that augmentation is required within five years because

MANAGING DEMAND IN WATER SERVICES INSTITUTIONS

the headroom will be less than 5% (the benchmark for best practices). The following schemes were identified to have headrooms of less than 5%:

- Port St Johns
- Kokstad water supply scheme
- Engcobo water supply scheme

Augmentation of water supplies will divert financial resources from other high priority activities such as economic growth that will contribute to poverty eradication. Additional water resources allocated to one sector might impact on the water resource availability to other water user sectors. The negative impact on the consumers is a potential increase in the tariffs, which will reduce the disposable income of the community. It does not therefore mean that because the water resources are available, other resources such as finance are available for supply-side management.

One of the major constraints in implementing water conservation and water demand management in the Water Services Institutions of the Mzimvubu to Mbashe ISP area is the lack of relevant skills to develop business plans for the implementation of water conservation and water demand management measures, let alone implement such measures. Institutional strengthening is critical if improved demand management is to be achieved in the municipalities.

STRATEGIC APPROACH

The strategic approach that the DWAF needs is to ensure that Local Authorities develop effective and implementable water conservation and water demand management measures in their Water Services Development Plans (WSDPs) by providing strategic support and guidelines for preparing WC/WDM business plans. These measures must reflect the business case for municipalities to implement such measures. This strategy has the benefit of increasing the local municipality's revenue (through an appropriate rising block tariff). The resource of the local authorities can be efficiently allocated for priority projects rather than augmenting wastewater treatment plants, which cannot be operated efficiently because of capacity problems.

PRIORITY:

Medium

MANAGEMENT ACTIONS	RESPONSIBILITY
1. DWAF must assist the local authorities with the development of a Regional WC/WDM strategy for the whole Mzimvubu to Mbashe ISP area catchments. DWAF must assist local authorities by undertaking situation assessments and developing a business case that shows the benefits of implementing WC/DM measures.	Regional Office and DM

MANAGING DEMAND IN WATER SERVICES INSTITUTIONS		
2.	DWAF must publicise their guidelines on the development and implementation of WC/DM for Water Services Institutions	The DM's are responsible for initiating the awareness campaign with assistance from the Directorate: Water Use Efficiency
3.	DWAF must ensure that water is distributed efficiently by encouraging the water services institutions to initiate a metering programme, by implementing a leakage control programme and pressure management where it is relevant. The LM must update the primanry component and as-built drawings.	
4.	DM must initiate an awareness campaign with institutional stakeholders to educate them on the benefits of WC/DM such as maximising the return on existing capital investment.	
5.	Provide support to water services institutions to develop and implement WC/DM measures specific to their circumstances should be given by DWAF.	
6.	DWAF must ensure that all WSDPs spell out the targets to reduce wastage and the procedures to be followed to achieve these targets.	
7.	DWAF should encourage any current initiatives in water conservation and water demand management that are taking place.	
8.	DM should encourage the local authorities to implement rising block tariffs where this is not being implemented, as an economic instrument for reducing water use to sustainable levels.	
9.	The WSAs must develop water services policies and by-laws based on the DWAF generic policies and by-laws.	

Strategy No 4.2

WATER CONSERVATION AND WATER DEMAND MANAGEMENT STRATEGIES

MANAGING DEMAND IN THE IRRIGATION SECTOR

MANAGEMENT OBJECTIVE

The objective of this strategy is to ensure that the on-field and off-field water use by the irrigation sector is being efficiently utilised for the sustainable management of the water resources.

SITUATION ASSESSMENT

The irrigation sector in the Mzimvubu to Mbashe ISP area has an allocation of approximately 40 million m^3/a, which is 31% of the total water requirements. This amount is not significant when compared with the non-consumptive use by Eskom for hydropower generation. There are significant agricultural activities and irrigation of lucerne in the Mzimvubu key area, particularly in the former RSA areas of Matatiele and Kokstad. These areas are known to be utilising high technology for irrigation, namely sprinkler irrigation systems. Although there is limited scope for implementing WC/DM measures, the farmers have not yet approached DWAF to establish a WUA. The WUA needs to develop water management plans which can be used to benchmark their current irrigation practices with the best irrigation practices for the type of crops being grown.

Irrigation is also taking place in the upper catchments of the Mbashe key area including the Ncora Irrigation Scheme. In the Mbashe key area, the irrigation infrastructure is not functional resulting in approximately 50% of the water supplied to the field edge being lost in the case of the Ncora Irrigation Scheme. The lack of institutional capacity and managerial competence is further exacerbating the water losses from the irrigation scheme. A WUA has not yet been established for the area and no water management plans for the scheme are available.

There are other smaller irrigation schemes in former RSA areas of the Mzimvubu to Mbashe ISP area around Maclear. The irrigation practices for these schemes are not known. They need to be investigated to determine whether there is potential for implementation of best irrigation practices.

The provincial department of agriculture is also in the process of rehabilitating the small irrigation schemes in the former Transkei, including the Magwa tea plantations.

STRATEGIC APPROACH

The efficent use of water in the irrigation sector can be achieved if there are incentives given for irrigators to save water. This can be done by encouraging farmers to trade excess water they can make available from using efficient methods. Although the Mzimvubu to Mbashe ISP area has abundant water resources, the

MANAGING DEMAND IN THE IRRIGATION SECTOR	
priciples of trading water should be promoted. The proposed strategy is to encourage trading of water within and across sectors. This will provide the incentive for farmers to utilise their water efficiently and be able to trade the savings from efficient utilisation to other users.	
PRIORITY Low	
MANAGEMENT ACTIONS	RESPONSIBILITY
1. DWAF must identify the current water-use practices in the irrigation sector of the Mzimvubu to Mbashe ISP area.	DWAF Regional Office
2. DWAF must ensure that the guidelines and the best water-use practices for the irrigation sectors are publicised and communicated to the irrigators. The irrigators should be aware of how to develop the water management plans.	DWAF Regional Office
3. Encourage metering in the irrigation sector. Review pricing of irrigation water, taking into account efficiency and equity considerations.	DWAF Regional Office

STRATEGY NO 5: INSTITUTIONAL STRENGTHENING AND SU PPORT

THE NEED FOR AN INSTITUTIONAL DEVELOPMENT AND SUPPORT STRATEGY

In accordance with section 78 of the Water Services Act (Act No.108 of 1997), the Department of Water Affairs and Forestry (DWAF) has to transfer the water infrastructure to Local Authorities who have been designated Water Services Authorities. There is a requirement that Local Authorities and DWAF interact in the management of existing water supplies and in planning for new and additional water supplies in order for both parties to know and understand the opportunities and constraints of the available water resources. This interaction and sharing of knowledge should be reflected in the IDP and WSDP that are the responsibility of the Local Authorities. Due to the lack of skilled and experienced manpower within many of the LAs and their advisors, this has often not been the case. The result is that many IDPs and WSDPs that have been produced to date contain fundamentally wrong information and proposals that do not take account of the constraints and opportunities imposed by the available water resources. As a result these programmes, which are being adopted by the LAs will in many instances not be successful, resulting in much wasted effort and wasting of scarce resources. There is an urgent need for DWAF to proactively provide institutional support to the LAs in terms of closing the knowledge gap that presently exists, thereby ensuring that LAs (councillors and officials) and their technical advisors know and understand the limitations to water supply in their areas.

At a national level this overall strategy includes support for the formation of Catchment Management Agencies (CMAs) and Water User Associations (WUAs). These are national functions with national strategies and policies in place.

This ISP strategy addresses institutional support for development of water supplies to Local Authorities.

10.2 RELEVANT IDENTIFIED STRATEGIES

The following strategies form a part of this overall strategy:

5.1 Institutional Strengthening of Water Services Institutions

Strategy No 5.1

INSTITUTIONAL STRENGTHENING OF WATER SERVICES INSTITUTIONS

MANAGEMENT OBJECTIVE

The objective of this strategy is to ensure that the transfer of DWAF water infrastructure assets to Local Authorities (LA) that have been designated Water Services Authorities is done in a sustainable manner. IDPs, WSDPs, Water Sector Plans and water feasibility plans should reflect the opportunities and constraints in these LA.

SITUATION ASSESSMENT

The water supply situation in most of the towns in the ISP area is currently adequate with exceptions described under each key area.

Since the establishment of District Municipalities as Water Service Authorities, DWAF is now in the process of transferring the water infrastructure assets to these authorities. the meantime other Local Municipalities have been designated Water Services Authorities. This has caused some conflicts between the investigations for additional or new water supplies to local authorities that have been undertaken by the District and Local Municipalities using technical advisors (consulting engineers). In most cases the capacity and water management expertise in the DM and LM is insufficient. When requested, DWAF regional office staff has assisted municipal officials in compiling acceptable programmes and plans. However, in many cases this has not happened and unacceptable proposals for water supply options are often recommended for implementation by municipal officials, i.e. there are often insufficient raw water resources available or there are competing interests requiring the same source. This only becomes known when applications are made to DWAF for water licences. This gives the appearance that DWAF is delaying what are often seen as urgent and necessary water supply schemes and leads to misunderstanding and a breakdown in co-operative governance.

Local and District Municipalities are mostly unaware of provincial and national priorities when producing their IDPs and WSDPs. Until these documents are completed to an acceptable level of accuracy and detail, the information regarding the anticipated future water requirements and sources of supply for local authorities remains uncertain. Support requested and given by DWAF at the initial stages of compiling the WSDP's would overcome many of the problems encountered with the WSDP's to date. Often the fault lies with inexperienced consultants appointed by the LAs.

Many LAs obtain all or a portion of their water requirements from schemes which they own and operate. These LAs are often unaware that they must consult with DWAF, as the government department responsible for the management of the water resources, before making or approving recommendations regarding water supplies. In addition, there is

often a general lack of capacity within many LAs to participate and to take responsibility for their mandate.

The following issues and concerns have been identified:

- The water infrastructure can become a liability to local municipalities because of the capacity constraints. DWAF needs to ensure that the transfer of assets is done in conjunction with the development of capacity in these Local Municipalities particularly at management level. Services have been upgraded in most small towns under the CMIP programme. This programme has now been integrated into the Municipal Infrastructure Grant (MIG).

DWAF and the District and Local Municipalities do not have an adequate process of interaction, information sharing and co-operative governance.

STRATEGIC APPROACH

The strategic approach for DWAF is to work with each LA in the development of institutional capacity for the LA to be able to manage the assets being transferred to them by DWAF. This approach must promote up-front liaison and agreement between DWAF and the LA regarding the transfer of assets.

DWAF's strategy should be to ensure that the WSDPs that are developed by the Local Authorities are aligned with the ISP, NWRS and Catchment Management Plans. WSDPs should highlight water conservation and demand management measures proposed by the LA in addition to current sources of supply and future anticipated sources of supply. Future planning should consider applicable social, environmental and economic impacts and costs.

The RO must identify outstanding WSDPs and ensure that they are submitted timeously. They must review the IDPs, WSDPs and Water Sector Plans and provide feedback to the relevant LAs to ensure that proposals conform to DWAF requirements. IDPs and WSDPs must become the documents that reflect the total municipal water strategies.

The LAs should be encouraged at every available forum, committee or other venues jointly attended by DWAF and and the LAs to first pursue alternative augmentation options, such as water demand management, effluent reuse, water trading or eradication of alien plants in water-stressed areas before applying for additional surface or groundwater use. Where future water supplies have not been identified in the WSDPs, further feasibility studies must be undertaken by the LAs.

An approach and strategy for water supply must be developed for each town. There is a very real need to assist with building capacity at District and Local Municipality level.

MANAGEMENT ACTIONS	RESPONSIBILITY

INSTITUTIONAL STRENGTHENING OF WATER SERVICES INSTITUTIONS		
1.	The RO must review the WSDPs and follow up with the LAs in cases where plans submissions are incomplete or have not been submitted. The RO must pro-actively assist the LAs with regard to development of water supply schemes and water demand management investigations and implementation programmes.	All Directorates in DWAF Regional Office.
2.	Update the data of all municipal water sources, requirements, issues and future augmentation plans etc as contained in this Strategy. Advise LAs and their technical advisors to interact upfront with DWAF before finalising water supply options.	DWAF Regional Office
3.	Request D: WUE at DWAF Head Office and the regional WC division to assist LA to overcome the technological barriers many of the local municipalities in the area face with the development and implementation of WC/DM strategies.	DWAF Regional Office
4.	Aim to improve borehole monitoring and ensure that water management plans are compiled. Directorate: Information Programmes and RO Hydrological Information Sub-Directorate must investigate this and compile a strategy to deal with the situation.	DWAF Regional Office
5.	Co-ordinate with the OR Tambo, Chris Hani, Alfred Nzo, Ukhahlamba and Sisonke DMs on the further studies into future water supply options to their areas.	DWAF Regional Office

STRATEGY NO 6: SOCIAL AND ENVIRONMENTAL

THE NEED FOR SOCIAL AND ENVIRONMENTAL STRATEGIES

Water for poverty eradication, for equity, and as a generator for economic growth is a major focus of both central and provincial government that will be pursued under this strategy. In addressing imbalances of the past, the provision of an equitable share of available water to previously disadvantaged communities is being addressed to improve the livelihoods of the poor. The establishment of resource-poor farmers, and the provision of water to areas in which land restitution is in progress, must be prioritised as one of the ways to reduce poverty. The water reconciliation for the ISP area has shown that water is available for allocation to resource-poor farmers ,especially in the former Ciskei and Transkei homeland areas where new and revitalised irrigation schemes are being established. This strategy will support the recent Eastern Cape Provincial Government's Growth and Development Strategy.

RELEVANT IDENTIFIED STRATEGIES

The following specific strategy has been developed further:

6.1 Poverty eradication, resource-poor farmers and revitalising of small irrigation schemes.

Strategy No 6.1

POVERTY ERADICATION, EMERGING FARMERS AND REVITALISING OF IRRIGATION SCHEMES

MANAGEMENT OBJECTIVE

The objective of this strategy is to provide support to the Provincial Government's poverty eradication and food security objectives outlined in the Eastern Cape Provincial Growth and Development Strategy (PGDS), which identified poverty eradication as having the highest priority.

SITUATION ASSESSMENT

The Mzimvubu to Mbashe ISP area largely comprises the former homeland of Transkei. The socio-economic baseline that was recently carried out by Edwards (2003) indicates that there is widespread and deep poverty with an estimated 67% of the population of the Eastern Cape below the poverty line (defined in terms of income). The majority of this population is located in the former homeland areas of the Ciskei and Transkei, which are mainly rural.

The underdevelopment of the agricultural potential of the province is both a cause and effect of the poverty that exists. At provincial level the sustainable development of the "abundant" natural resources of water and land has been identified as one of the main keys to poverty eradication. As such, food security has been prioritized and will be addressed through household food production programmes and increased support to black commercial farmers through credit and low interest loans, additional land etc (the Massive Food Production Programme and the Integrated Rural Development Programme).

The PGDS 2004-2014 in the Eastern Cape embodies the following:

- A clear vision for the long-term development in the former homeland of Transkei situated in the Mzimvubu to Mbashe ISP area.
- A quantified vision and sequenced targets for economic growth, job creation, poverty eradication, human development and institutional transformation
- A 10-year strategy for Provincial Growth and Development, identifying priorities and key programme thrusts.

DWAF is co-operating with other departments to ensure that the management of water resources can contribute to the strategic framework for growth and development, with particular emphasis on interventions to reduce poverty and increase food security.

POVERTY ERADICATION, EMERGING FARMERS AND REVITALISING OF IRRIGATION SCHEMES

Interventions under the Integrated Rural Development Programme (IRDP) include:

- Modifying water resource management programmes and priorities to align with the priority areas identified for the IRDP.
- Ensuring that rural development features strongly in catchment management strategies.
- Identifying rural water needs and opportunities, and making specific allowances for rural development and livelihoods in allocating water. In particular, identifying potential rural users, in addition to registered users, in calling for licence applications during licensing.
- Ensuring community representation on the management bodies of water management institutions.
- Ensuring that communications, awareness creation and education programmes are appropriate for rural communities.

The following mechanisms exist to alleviate poverty in terms of the broader Water for Equity approach:

- Providing subsidies to resource-poor farmers in terms of the DWAF pricing strategy.
- Assistance to small towns and rural settlements for general access to water.
- Creation of employment opportunities under the Working for Water and Working for Wetlands programmes.
- Assistance to farm workers, such as extension service, management support, etc.

The following national issues and concerns have been identified regarding resource-poor farmers and rural settlements:

- The process to implement schemes for resource poor farmers is a lengthy one.
- DWAF provides access to water but land acquisition falls under other authorities (Department of Land Affairs and Department of Agriculture).
- DWAF can only subsidise farmers who are included in WUA's or other recognised water management institutions.
- Capital costs to acquire existing farms or to establish infrastructure on new land is high.
- Land reform has not been overly successful to date.

A number of initiatives in this ISP area have already been started by the Provincial Department of Agriculture and the District Municipalities. DWAF is assisting with these initiatives through the CCAW by rehabilitating the irrigation systems and, providing financial and resource support to these organisations. Most of these schemes are centred on irrigation projects and bulk water supply schemes and dams that were originally implemented

under the former Ciskei and Transkei homeland governments. During the political transition period of the mid 1990's, most of these schemes fell into disuse with very little farming activity taking place. With the adoption of a new provincial strategy, which identifies poverty alleviation and self-sufficiency in food as one of its main goals, major emphasis is now being place on rehabilitating these schemes, either partially or wholly.

The following schemes have been identified for possible subsidy assistance by DWAF and the Provincial Department of Agriculture and an investigation study is presently underway:

- Ncora Irrigation Scheme Extension, which consists of a potential further 1 000 ha of irrigable land being developed, as well as the development of 2 000 ha in the Qumanco region. The feasibility of these extensions depends on the water availability from the Ncora Dam.
- Possible small schemes in the Lower Mzimvubu catchments near Port st Johns.
- Mngazi Irrigation Scheme.
- A number of small-scale irrigation schemes exist in the ISP area. Most of these schemes have fallen into disrepair since government began withdrawing from irrigation as part of the Irrigation Management Transfer (IMT) to farmers. Most of these schemes were provided management support by ECATU which has since been disbanded.

STRATEGIC APPROACH

DWAF has prioritised water for equity, but not at the expense of efficiency and beneficial use. DWAF supports the PDoA in providing water for resource-poor farmers provided the water is available and allocations have been prioritized. This requires close co-operation between DWAF and the PDoA.

DWAF will honour the allocations made to irrigation schemes and supports the revitalization of existing but defunct schemes. This should take into account the following:

- Alternatives to allocating and distributing this water to a wider spread of the population for more effective poverty relief should be examined.
- Irrigation schemes which will clearly never be viable and where water and investment will be wasted should not be revitalized. DWAF and the PDoA should reach consensus on such schemes as a matter of urgency.

PRIORITY

Very High

POVERTY ERADICATION, EMERGING FARMERS AND REVITALISING OF IRRIGATION SCHEMES	
MANAGEMENT ACTIONS	RESPONSIBILITY
The needs of prioritised resource-poor farmers should be addressed through the CCAW, through co-operative governance between DWAF, the Department of Land Affairs, the Department of Agriculture, appropriate District Municipalities and DAET as follows:	
1. Identification of areas where it may be possible to develop and sustain resource-poor farmers in the ISP area, especially those areas where bulk water supplies (and dams) are in place with existing water rights.	DWAF Regional Office ICW
2. Identification and short-listing of schemes by the CCAW for further evaluation. The District Municipalities must be requested to provide information on potential small and large-scale irrigation developments identified in their areas, including the requirements for home gardens. DWAF will provide the water resource availability scenario to aid the identification process.	Provincial Department of Agriculture
3. Evaluation of the short-listed and prioritised schemes through planning studies to determine the feasibility of the schemes.	Provincial Department of Agriculture
4. Develop ways in which appropriate relevant information regarding water requirements and water availability can be effectively assessed and expressed in a structured way to the CCAW. A protocol for a structured sharing and transfer of information, particularly between DWAF, the PDoA and the District Municipalities, regarding potential resource-poor farmer (and commercial) irrigation developments and required water resources must be implemented.This can be done by ensuring an effective functioning Provincial Liaison Committee.	DWAF Regional Office
5. Develop ways in which the irrigation development needs of the PDoA in line with the provincial economic development strategy and various priority lists can be effectively communicated to the CCAW in a structured way	DWAF Regional Office
6. Attach a high priority to the forming of WUAs where the needs of resource-poor farmers have been prioritised, once the schemes have been proven to be sustainable.	DWAF Regional Office
7. Arrange payment of a subsidy to the WUAs once they are established and assist with the sourcing of such funds if necessary according to the procedure for funding and construction of such schemes, as devised by D: WU.	DWAF Regional Office

STRATEGY NO 7: INTEGRATION AND CO-OPERATIVE GOVERNANCE

THE NEED FOR INTEGRATION AND CO-OPERATIVE GOVERNANCE STRATEGIES

This strategy addresses co-operative data collection, information sharing, sharing of visions and plans, and co-operative making of joint decisions which are satisfactory or at least acceptable to all parties. The ISP strategies interface with those of other central and provincial government departments, local authorities and water service providers. Consequently, there is an inherent need for establishing co-operative relationships with such organisations. This is required to ensure that management and control of the water resources in the ISP area are integrated with the relevant strategies of other organisations, whilst meeting the requirements of particular legislation with which it must comply.

The Integration and Co-operative Governance Strategy is required to address:

- ⇨ Regional, local and sector-specific co-operative governance.

10.3 RELEVANT IDENTIFIED STRATEGIES

The following specific strategy has been developed further:

7.1 Co-operative governance

Strategy No 7.1

CO-OPERATIVE GOVERNANCE

MANAGEMENT OBJECTIVE

To improve co-operation and co-ordination between DWAF personnel and other authorities regarding information sharing and decision-making and thereby achieve improved management of the water resources in the Mzimvubu to Mbashe ISP area.

SITUATION ASSESSMENT

Due to the integrated nature of water resource management, co-operative governance is linked to all of the strategies discussed in the ISP. Furthermore, land-affairs issues, land-use issues and marine issues are all related to water resources in one way or another. Consequently, the effective and efficient management of water resources requires co-operation between DWAF, other government departments and local authorities and parastatals such as Eskom and Water Boards.

In the spirit of good co-operative governance, the DWAF Regional Office has been involved with:

- Liaison with DEAET, the Department of Agriculture and local authorities through the Stream Flow Reduction Activities Licence Assessment Advisory Committee (SFRA LAAC).
- The existing Wetlands and Riparian Zone Delineation Policy Committee between DWAF and DEAT.
- The existing Provincial Liaison Committee and its sub-committees, such as the CCAW involving DWAF, the Department of Agriculture, DEAT and the Department of Land Affairs.
- The existing Integrated Water Services Management Forum.

The generic issues and concerns relating to co-operative governance requirements are identified as follows:

- The need for co-operative governance in the sharing of information and approval and licensing of all water related activities.
- Delays caused by the lack of capacity, finances or lack of knowledge on the part of officials within different government departments.

There is a need to consolidate data information systems in the region and improve the sharing of water-resource related information (and other information) between government departments, local authorities and institutions to avoid duplication of effort in an area with a scarcity, skilled manpower and financial resources.

The management and operation of purification, wastewater treatment works and solid waste sites by local authorities in order to meet the standards and requirements set by DWAF.

Pollution of rivers and the marine environment due to inadequate and/or poorly maintained and operated infrastructure services under the control of local municipal authorities.

The need for co-operative governance between WfW and DEAT regarding the benefits of clearing of invasive alien plant.

The following issues and concerns relating to co-operative governance in the Mzimvubu to Mbashe ISP area have been identified:

- The need for co-operative governance relating to pollution in the Mtata River due to overflow of effluent discharges and the stormwater runoff.
- Sedimentation of rivers and dams due to land ownership and poor land use practices, especially in the former Transkei components of the ISP area.
- The need for improved co-operation between DWAF, DLA, PDoA and DEAT for the management of wetlands, marine environments and estuaries, soil conservation and invasive alien plant control programmes.
- The need for alignment between the Eastern Cape Provincial Growth and Development Strategy, the IDPs and WSDPs and the ISP.
- The need to align DWAF programmes with the four Integrated Sustainable Rural Development programme nodes namely the Alfred Nzo, OR Tambo, Chris Hani and Ukhahlamba District Municipalities which are home to both the deepest poverty and areas of rich natural resources.
- Need for groundwater representation on the CCAW because of the lack of co-ordinated drilling, often taking place unknown to DWAF.

STRATEGIC APPROACH

Promote the effective management and co-ordination of water resources in the ISP area through co-operation between DWAF, other government departments, local authorities and parastatals. Continue involvement in the various co-operative management bodies already established, and ensure active involvement in new liaison bodies that are being or will be established to contribute towards improved water management.

PRIORITY High	
MANAGEMENT ACTIONS The following specific actions are required to address issues and concerns in the ISP area:	RESPONSIBILITY
1. Study and provide feedback on the Provincial Situation Assessment and Provincial Strategy framework recently undertaken by the Eastern Cape Provincial Government.	DWAF Regional Office
2. Arrange a meeting between DWAF and DEAT to establish a permanent co-operative liaison body for improved co-ordination and information sharing regarding the management of wetlands, estuaries, marine environments and invasive alien plant control programmes.	D: NWRP & DWAF Regional Office
3. Arrange a meeting between DWAF and PDoA to initiate co-ordination regarding land-use issues and soil conservation programmes.	DWAF Regional Office
4. Establish a co-operative initiative with local authorities and the Department of Housing and Local Government especially with respect to planning for future water needs and water conservation and demand management.	DWAF Regional Office
5. Develop and implement an action plan to ensure that all infrastructure planning processes that impact on water resources are aware of DWAF requirements.	DWAF Regional Office
6. Develop and implement an action plan to ensure DWAF input and requirements for IDPs and WSDPs during compilation.	DWAF Regional Office
7. Ensure groundwater representation on the CCAW.	DWAF Regional Office

STRATEGY NO 8: MONITORING AND INFORMATION MANAGEMENT

THE NEED FOR MONITORING AND INFORMATION MANAGEMENT STRATEGIES

The National Water Act requires the Minister to establish monitoring systems for water resources to collect appropriate data and information. As part of the national Monitoring and Information Strategy which forms part of the NWRS, the Department is addressing the inadequacies and shortcomings of the current arrangements by amalgamating all existing and planned monitoring and assessment systems into a structured and coherent monitoring, assessment and information management system. This system and the data captured on water availability, water use and water quality is required for effective and efficient management of an increasingly scarce resource.

Monitoring is required to ensure compliance with water authorisation conditions and licensing, to control all water use and also for billing and revenue collection.

- The Monitoring and Information Management Strategy is required at a National, Water Management Area and Catchment level to:
- Improve monitoring networks and data capturing for water use control (availability, allocations, licensing and revenue collection)
- Obtain and capture accurate data on the physical, chemical and biological aspects relating to surface and groundwater resources (quality)
- Improve on efficiencies in gathering of information, particularly through institutional co-operation in data capture and management
- Set and maintain standards for the capture, processing and management of accurate data information
- Ensure that information systems are easily accessible both within DWAF and to outside stakeholders without compromising data security.

RELEVANT IDENTIFIED STRATEGIES

The following specific strategies have been developed further:

8.1 Monitoring networks and data capture
8.2 Information management

Strategy No 8.1

MONITORING AND INFORMATION MANAGEMENT STRATEGIES

MONITORING NETWORKS AND DATA CAPTURE

MANAGEMENT OBJECTIVE

The installation of effective national and regional monitoring networks and the accurate population of databases to ensure sustainable water use (monitor the balance between availability and requirements), to ensure the control and billing of water use, maintain the resource base by ensuring the maintenance of ecosystem health (Reserve) and to ensure the protection of surface water resources and groundwater (water quality).

SITUATION ASSESSMENT

The National Water Act requires the Minister to establish national and regional monitoring systems for water resources to collect appropriate data and information necessary to assess the following:

- The quantity, quality and use from and effluent return to surface and groundwater resources
- The rehabilitation of water resources
- Compliance with resource quality objectives
- The health of aquatic ecosystems
- Atmospheric conditions which may influence water resources
- Other data necessary for the management of water resources such as billing and tariff calculations

To meet the requirement for detailed integrated information, DWAF is currently reviewing, and revising at a national level, all data-acquisition, monitoring and information systems.

In addition to national networks required for assessing water availability and use, the following national water quality monitoring networks are required:

- National Chemical Water Quality Monitoring Network
- National Microbial Monitoring Network

MONITORING NETWORKS AND DATA CAPTURE

- National Eutrophication Monitoring Programme
- National River Health Programme
- National Toxic Monitoring Programme
- National Radioactivity Monitoring Programme (is being tested)
- National Estuarine Monitoring Programme (is planned).

Monitoring networks and data capture on water use aspects within the Mzimvubu-Mbashe ISP area are far below optimal, especially in the former Transkei areas, due to under-resourcing. Very little monitoring by DWAF of water use from surface water resources to small towns is done in the region. Monitoring is mainly undertaken for those supplies from DWAF owned dams or those for regional water supply schemes originally funded by DWAF.

The location and status of monitoring boreholes of small towns and coastal villages is poorly documented. Actual groundwater abstraction information is also generally not available from these towns and villages. In most instances officials responsible for these schemes do not have the technical expertise or capacity to do groundwater monitoring over an extended period and DWAF lacks the capacity to adequately undertake such monitoring on their behalf.

Flows in rivers are monitored at national monitoring stations. The number of operational flow monitoring sites, where flow is measured at reservoirs, at transfer schemes, at major irrigation schemes and at estuaries needs to be greatly expanded.

Within the former RSA component of the area, the regional hydrological data capture systems and databases are generally regarded as being the minimum acceptable to regional DWAF staff (monitoring and capturing of rainfall, evaporation, surface water, ground water and water quality). The available information and monitoring systems and resources to capture data are however not acceptable. Previous attempts at establishing sustainable GIS capacity in the region have failed. There is a lack of skilled personnel within DWAF and within the municipalities to undertake adequate monitoring, together with a lack of funds to increase monitoring points at an acceptable rate. This situation is worse for the former Ciskei and Transkei areas. An example is that of water quality samples, which are taken monthly by DWAF and not every two weeks, due to a lack of manpower and financial resources.

Water quality monitoring is sparse and sporadic throughout the area due to a lack of skilled manpower resources, both at the regional (DWAF) level and at the local (municipal) level. The near to pristine nature of many of the rivers and estuaries in the area and their important role in the region with regards to biodiversity, fish breeding and recreational activities and tourism requires that improved and expanded monitoring systems be formulated. As the overall responsible authority for the water quality of the rivers, it is incumbent on DWAF to ensure that all rivers are adequately monitored, either by DWAF personnel or by local municipal authorities.

The Mtata River is being polluted heavily by discharging effluent which is not up to the water quality standards.

MONITORING NETWORKS AND DATA CAPTURE	
This has resulted in cholera outbreaks in the area although it was established earlier that a detailed monitoring and data collection programme is urgently required in order to identify the impacts and institute steps to improve the health of the rivers. Both national and regional monitoring systems are spatially inadequate and operate largely in isolation of each other. Whilst DWAF is actively working to structure its systems into a single "Monitoring, Assessment and Information System (MAIS)", this strategy will need to address networks and funding, staff capacity, and co-operative relationships with other organisations. The current resources in the RO to implement this strategy are inadequate. This result in monitoring only of perceived critical data at intervals that is too long. There is a lack of monitoring of the area of the Mzimvubu key area that is currently managed by the KwaZulu – Natal Regional Office. The monitoring of this area should be incorporated into the overall monitoring programme of the Mzimvubu to Keiskamma WMA.	
STRATEGIC APPROACH The strategy is for DWAF to ensure that the monitoring of water resources, both quantity and quality, in the Mzimvubu – Mbashe ISP area, with water quality monitoring particularly in the Mtata key area, is conducted. Manpower and financial resources are severely limited and the Department will have to invest heavily in monitoring if it is to fulfil its requirements as mandated under the NWA. The implementation of an adequate monitoring programme will require the installation of significant new equipment and infrastructure e.g. weirs etc, a major increase in staff capacity, the bringing of all water quality monitoring up to standards, with an emphasis on potential crisis areas. Many different organizations are involved in monitoring and the first step for DWAF will be to co-ordinate these disparate organizations. At the same time this will require DWAF to share data and information.	
PRIORITY Medium to High.	
MANAGEMENT ACTIONS Develop a detailed regional strategy that is compatible with the national information system for the monitoring needs of the ISP area by undertaking the following generic actions: 1. Establish a regional task team and review or identify all aspects that need to be monitored. Group all monitoring needs into logical systems with common goals according to functional areas, which are then divided further into sub-systems. This will include but not	RESPONSIBILITY The development of this strategy is the responsibility of the RO in consultation with

be limited to: ❑ Hydrology (rainfall, climate and streamflow) ❑ Geohydrology (groundwater) ❑ Inflows and outflows (transfers) ❑ Abstractions (Water users, dam levels, operational releases, losses etc) ❑ Water quality (surface and groundwater) ❑ Return flows ❑ Waste water outflows ❑ River health ❑ Sedimentation ❑ Small farm dams (numbers, capacity and use) ❑ Land-use changes (agricultural cropping, forestry, invasive alien plants) 2. Develop a detailed information requirement and monitoring needs assessment for the various systems, which are grouped by functional areas. 3. Prepare a set of standards for monitoring and data capture which must cover accuracy, completeness, time scales and time frames, information sharing etc. 4. Identify and motivate for additional monitoring points or functions required for the ISP area in a phased implementation manner, based on priorities. 5. Amalgamation of the identified existing and planned monitoring and assessment systems needs into a coherent and structured monitoring, assessment and information system. 6. Review staff resources required for adequate monitoring of surface and groundwater and employ, develop and train additional staff where identified. 7. Motivation for the regional share of the national monitoring budget. 8. Develop regional co-operative, collaborative relationships between DWAF and other organisations that have relevant data or operate water-related monitoring, assessment and information systems. This should include a plan for storage and sharing of mutually useful information. 9. Regularly review and update the regional monitoring strategy. 10. Ensure that the Mtata River is regularly monitored upstream of the Mtata Dam and downstream below the First and Second Falls dams. 11. Co-ordinate and prioritise monitoring and implementation of groundwater supply,	the RDM office and the Directorates of Information Programmes, Waste Discharge and Disposal and the IWQS. Co-operative governance liaison should be developed with the provincial departments of Local Government, Health and the District Municipalities.

MONITORING NETWORKS AND DATA CAPTURE	
spring protection and borehole remediation with the sanitation programme. 12. Define the method and establish guidelines acceptable to theSABS for monitoring at springs (water quality and flow). 13. Integrate the surface, groundwater and ecological monitoring in NWA context, particularly at the coastal and spring localities. 14. Outsource the monitoring and data processing as required rather than delay implementation. *Surface water monitoring:* Continue existing monitoring and data-capturing systems and identify the need to install additional rainfall, flow or estuarine recorders. *Groundwater monitoring*: Build capacity, especially at local authority level. Additional staff is also urgently required in the RO. *Water quality monitoring*: This was largely addressed in the *Water Quality Management Strategy*, which also dealt with water quality monitoring needs. *Coastal and marine monitoring* is required and assistance should be obtained from the Coastal and Marine Research Institute of Port Elizabeth and/or the South African Institute for Aquatic Biodiversity in Grahamstown. These two organisations could be part of a co-operative governance effort.	

Strategy No 8.2

INFORMATION MANAGEMENT

MANAGEMENT OBJECTIVE

Facilitate improved storage, manipulation, backup, archiving, dissemination, access to and sharing of information within the ISP area and WMA.

SITUATION ASSESSMENT

National systems will be designed so that Catchment Management Agencies, once established, can take responsibility for information management in their Water Management Areas, as well as have access to information from adjacent areas. The national information system for water services required by the Water Services Act will be linked to information systems for water resources. The Act requires any person, at the request of the Minister, to provide data and information to facilitate the management and protection of water resources. Regulations may be written in this respect. The Minister is required by the NWA to establish the following national information systems:

a. Surface Water Hydrology

The Department's existing mainframe-based *Hydrological Information System*, and several related systems are being replaced with a new server-based commercial system. It is expected to be operational at all DWAF Regional Offices by 2004.

b. Water Quality

The Department is developing the *Water Management System* for the operational management of water quality monitoring systems, and storing, processing and disseminating the results arising from monitoring. The *Water Management System* is currently functional and operational in the Department's National Head Office and one Regional Office. The system is expected to be fully operational throughout the Department in 2007.

c. Groundwater

The present mainframe-based national groundwater database is to be replaced with a server-based, web-enabled *National Groundwater Archive*. The development of the system and transfer of all data is expected to be completed by 2004. The Archive will be linked to a proprietary system that provides management information by modelling groundwater recharge, the impacts of abstraction, and the impacts of aquifer contamination. The system was installed in the Department's National Office and three Regional Offices by the end of 2002, and will be fully operational in all Regions by 2004.

d. Water Use Registration and Authorisation

The *Water Use Authorisation and Registration Management System* (WARMS) is a comprehensive system designed to manage the process of registering water use and the authorisation of water use (by licensing), as well as manage administrative components of the water charge system. The registration component of the system has been in use since 2000. The cost recovery functions became operational early in 2002, with the licensing capabilities to follow in 2003. Links with national databases operated by other departments should be established by 2004.

e. State of Rivers Reporting

The *National River Health Programme* intends to produce *State of the Rivers Reports* for all major river systems in the country by 2008. The reports will indicate the present state of the rivers, whether conditions are stable, deteriorating or improving, what is causing the state of the river to change, and what management interventions are required.

The following monitoring strategy issues and concerns were identified in the Mzimmvubu to Keiskamma WMA :

- The need to share information, responsibilities, databases and other related issues and actions.
- Inability of the WARMS to handle water-use queries per catchment area.
- The *Water Quality and Quantity Water Management System* (WMS) will supersede the *Pollution Monitoring and Capture System* (POLMON).

The following information management related issues and concerns were identified:

- There is ongoing capturing according to priority in the registration process. Data of some water users and solid waste sites have not yet been captured.
- There is an ongoing mapping project that captures data on invasive alien plants.
- There was a loss of captured solid waste site data in the RO due to inadequate backup facilities. Only 20% of solid waste sites are now populated in the *Waste Manager* programme (waste permit information).
- There is an urgent requirement for adequate data storage, backup and archiving systems for captured data in the Eastern Cape Regional Office.
- The availability and retention of suitably trained and qualified staff is a problem.

The current resources in the RO to implement this strategy are inadequate. Skilled IT and GIS staff, funds to buy and properly manage the software and databases and technical staff to evaluate, manage and improve the systems and databases and to liaise with other information managers are required. The available staff is very stretched and address issues according to priorities (reactive and crisis management). The most important activity is thus to increase skilled manpower resources. Restructuring is currently under way in the RO, which is a difficult time to increase resources, but is also an opportune time to divert appropriate resources to information management, which in the past generally seemed to be undervalued in importance.

INFORMATION MANAGEMENT	
STRATEGIC APPROACH Data is valuable and expensive, and adequate systems and staff must be provided to ensure the accurate capture and storage, retrieval processing and dissemination. The Department recognizes the inadequacies of the current monitoring and information systems and proposes that an Information Management Plan be instituted through this ISP.	
PRIORITY Priority 2 – High. Implement over the medium term.	
MANAGEMENT ACTIONS	RESPONSIBILITY
Compile an ISP area Information Management Plan as follows: Identify what information the Departmental information managers require. Determine GIS specific requirements such as hardware for storage. Identify information requirements from other departments, provincial and local government and other organisations. Compile an information sharing policy with other departments, provincial and local government and other organisations and identify the following: • What information should be shared? • Who should have access to it? • What is the integrity of the information to be shared? • With whom is sharing of information beneficial? Implement the information sharing policy through co-operative governance with other departments, local authorities and institutions through various formal and informal committees or other forms of effective co-operation. Re-capture waste-related permit information in *Waste Manager*. Install adequate storage, backup and archiving facilities and library systems in all the DWAF Eastern Cape Regional Offices.	A new Chief Directorate Scientific Services will be created to take overall responsibility. The development of the regional strategy is the responsibility of the RO.

INFORMATION MANAGEMENT	
Formulate an approach to deal with available WARMS information. Integrate the data, information and knowledge of previous studies into a WMA data base with data and information accessible at a quaternary catchment scale. Ensure that Geohydro has an updated list of all current projects in the area regardless of funding agent and receives the necessary feedback to update data base. Initiate a study to evaluate the existing geochemistry data base of Karoo rocks in order to short-list relevant trace elements to be monitored, particularly those that pose a health risk, such as arseno pyrites and fluoride. Establish the unexploited groundwater on an aquifer-specific basis per quaternary. Evaluate the potential to expand existing groundwater supply schemes and additional schemes for rural empowerment and poverty relief programmes in the light of the above and improved groundwater exploration practice as well as agricultural potential.	

REFERENCES AND REPORTS

1. Department of Water Affairs and Forestry, South Africa. 2004. National Water Resource Strategy First Edition.

2. Department of Water Affairs and Forestry, South Africa. http://www.dwaf.gov.za website

3. Department of Water Affairs and Forestry, South Africa. 8 October 1999. General Authorisations in terms of Section 39 of the National Water Act. Government Notice No. 1191.

4. Department of Water Affairs and Forestry, South Africa. 1999. Pricing strategy for raw water use.

5. Department of Water Affairs and Forestry, South Africa. February 2003. Undertaking Reserve determinations at various levels for the various freshwater bodies. Latest available comprehensive set of documentation.

6. Department of Water Affairs and Forestry, South Africa. February 2003. Vision and Mission Statement for Managing Water Resources in South Africa.

7. Department of Water Affairs and Forestry, South Africa. 2003. Eastern Cape Regional Office staff personal interviews.

8. JLB Smith Institute of Ichthyology. November 2001. A Survey of Selected Eastern Cape Estuaries with Particular Reference to Ichthyofauna. Ichthyological Bulletin No. 72.

9. Midgley, Pitman and Middleton. 1994. *Surface Water Resources of South Africa*: 1990. Water Research Commission Report No. 298/5.1/94.

10. National Water Act, 1998, Act 36 of 1998. Gazette No. 19182

11. National Environmental Management Act, Act 107 of 1998.

12. Ninham Shand. June 1999. *Eastern Cape Water Resources Situation Assessment*. Prepared for the DWAF. Report No PWMA 12/000/00/0101

13. Provincial Government of the Eastern Cape. June 2003. Strategy Framework for Growth and Development 2004 – 2014. Draft 8 (Approved).

14. South African Institute for Aquatic Biodiversity (AK Whitfield). Available Scientific Information on Individual South African Estuarine Systems.

15. Water Services Act, Act 108 of 1997.

16. Department of Water Affairs and Forestry, South Africa. 1998. *Mtata River Catchment. Framework Plan for the Development of a Catchment Management Strategy*. Ninham Shand (Pty) Ltd. Ninham Shand Report No. 8330/2912.

17. Department of Water Affairs and Forestry, South Africa. 2001. *Mtata River Basin Study*. FST Consulting Engineers in association with WRP. Report No P T200-00-1300.

18. Department of Water Affairs and Forestry, South Africa. 2004. Government Gazette No. 398: General Authorisations in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998).

19. Department of Water Affairs and Forestry, South Africa. 2004. Government Gazette No. 1227: General Authorisations in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998).

20. Republic of Transkei, Department of Works and Energy, 1990. *Mzimvubu Basin Development Study* Report No T300,XX/0990

21. Department of Water Affairs and Forestry, 2003. Overview of *Water Resources Availability and Utilisation* Report No PWMA 12/000/00/0203

22. Department of Water Affairs and Forestry, 2004. *Economic Information System. Urban Econ Development Economists. Eastern Cape Province Macroeconomic overview* Report No P RSA/00/15/00 July 2000

23. Department of Water Affairs and Forestry, 2002. *Population and Economic Scenario System. Urban Econ Development Economists*. MarkData in association with Eric Hall & Associates, STATOMET, PD Naidoo and Knight Piesold Report No P RSA/00/2200

24. Department of Water Affairs and Forestry, 1994. *Vaal Augmentation Planning Study* Report No C000 VAPS

25. Department of Water Affairs and Forestry, 2004. *Eastern Pondoland Basin Study*. UWP Consultants Report No PB T 600-00-0101

26. Department of Water Affairs and Forestry / King Sabata Dalindyebo Municipality, 2002. Status Quo Assessment and Pressure Management Pilot Study for the development of a water demand management strategy for KSD Municipality. WRP Consulting Engineers.

27. Ninham Shand, 2004. Kokstad Water and Wastewater.

28. Water Research Commission, 2004. Investigation of different farm tenure system and support structures to establishing small-scale irrigation farmers in long-term vaibale conditions. Tlou & Matji (Pty) Ltd.

29. Sellick, C., pers. comm, Charles Sellick and Associates, Cape Town, South Africa, July 2004.

30. Eastern Cape Province *Mzimvubu River Basin water utilization opportunities* October 2004 Report No P RSA/00/15/00

APPENDIX A

APPENDIX A1: DAMS, RIVERS AND TOWNS IN THE MZIMVUBU –MBASHE ISP AREA

Dam Number	Name	Latitude			Longitude			Nearest Town	River	Type of Wall	Wall Height (m)	Length of crest (m)	Type of spillway	Capacity 103 m^3	Area (ha)	Size	Hazard Potential	Category
T104-04	Collywobbles Dam	32	0	3	28	34	54		Mbashe River		0	0		0	0			0
T201-03	Mtata Dam	31	32	56	28	44	31	Mtata	Mtata River	Earthfill Dam	38	620	Ogee (overflow) Spillway	253 800	2541.7	L	H	3
T201-04	Coronia Dam-Transkei	31	25	30	28	52	3	Mtata	Corania River	Earthfill Dam	20	280	Side Chanel Spillway	950	14	M	B	2
T201-05	Noadu Dam - Transkei	31	24	20	28	45	30	Mtata	Goqwana River	Earthfill Dam	18	180	Inligting Onbreek	1420	34	M	B	2
T201-06	Mabeleni Dam - Transkei	31	26	45	28	33	45	Tsolo	Mhlahlane River	Earthfill Dam	13	464	Open Channel	2100	53	M	B	2
T201-07	First Falls Dam	31	35	45	28	49	0	Mtata	Mtata River	Concrete Gravity	16	232	Ogee (overflow) Spillway	789	27	M	B	2
T201-08	Second Falls	31	41	20	28	53	20	Mtata	Mtata	Concrete	16	240	Ogee (overflow)	1200	33	M	B	2

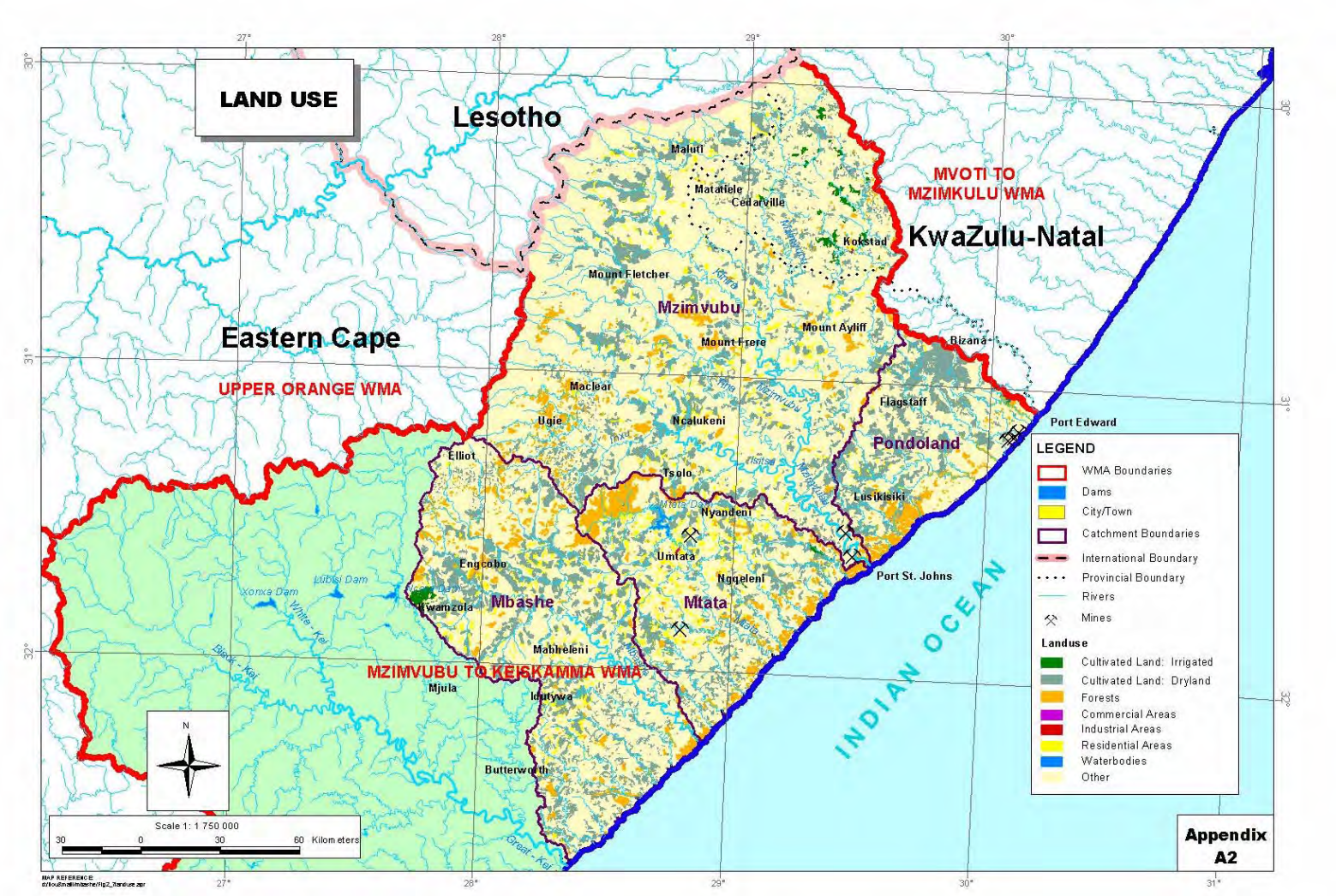
Dam Number	Name	Latitude			Longitude			Nearest Town	River	Type of Wall	Wall Height (m)	Length of crest (m)	Type of spillway	Capacity 103 m^3	Area (ha)	Size	Hazard Potential	Category
	Dam								River	Gravity			Spillway					
T300-04	Mountain Dam	30	22	1	28	48	1	Matatiele	Keneka River	Earthfill Dam	28	245	Side Chanel Spillway	1082	14	L	H	3
T300-16	Crystal Springs Dam	30	31	1	29	24	1	Kokstad	Mzintlava River	Earthfill Dam	21	374	Ogee (overflow) Spillway	2140	29	M	H	3
T301-18	Ben Voirlich Dam	31	12	1	28	12	5	Ugie	Wildebees River	Earthfill Dam	7	330	Open Channel	300	16	S	G	1
T301-19	Highfield Dam	31	5	48	26	27	13	Maclear	Ncota River	Earthfill Dam	5	0	Side Chanel Spillway	100	3	S	G	1
T301-21	Wizard Vale Dam	31	7	1	28	27	1	Maclear	Niatu river	Earthfill Dam	6	104	Open Channel	240	8	S	G	1
T301-23	Agassiz Dam	31	17	49	28	19	1	Ugie	Gqaqala River	Earthfill Dam	9	105	Open Channel	245	8	S	G	1
T301-24	Ugie Dam	31	12	0	28	14	0	Ugie		Earthfill Dam	7	410	Side-Chanel Spillway	387	16	S	B	2
T301-25	Glen Rowan	31	17	8	28	17	51	Ugie	Gqaqala	Earthfill	8	90	Open	237	7	S	G	1

Dam Number	Name	Latitude			Longitude			Nearest Town	River	Type of Wall	Wall Height (m)	Length of crest (m)	Type of spillway	Capacity 103 m^3	Area (ha)	Size	Hazard Potential	Category
	Dam								River	Dam			Channel					
T304-17	Glencoe Dam	29	59	1	29	16	1	Swartberg	Krom River	Earthfill Dam	9	100	Side-Chanel Spillway	360	12	S	G	1
T304-18	Krom Drift Dam	30	4	20	29	14	1	Swartberg	Krom River	Earthfill Dam	8	130	Side-Chanel Spillway	900	36	S	G	1
T304-25	Lillyfontein Dam	30	29	1	29	10	1	Cedarville		Earthfill Dam	9	100	Open Channel	200	5	S	B	2
T304-26	Welbedacht Dam	30	16	30	28	56	50	Cedarville	Tswereka River	Earthfill Dam	11	230	Open Channel	580	15	S	B	2
T304-27	Kingston Dam No.1	30	4	1	29	10	1	Kokstad	Mzimvubu River	Earthfill Dam	7	100	Ogee (overflow) Spillway	109	2	S	G	1
T304-29	Lucknov Top Dam	30	32	1	29	14	1	Kokstad	Mzimvubu River	Earthfill Dam	9	280	Open Channel	70	3	S	G	1
T304-30	Lucknov Bottom Dam	30	31	57	29	12	45	Kokstad		Earthfill Dam	10	224	Open Channel	106	5	S	G	1
T304-31	Annie's Valley Dam	30	17	15	28	57	15	Mataitele		Earthfill Dam	10	0	Open Channel	240	6	S	G	1

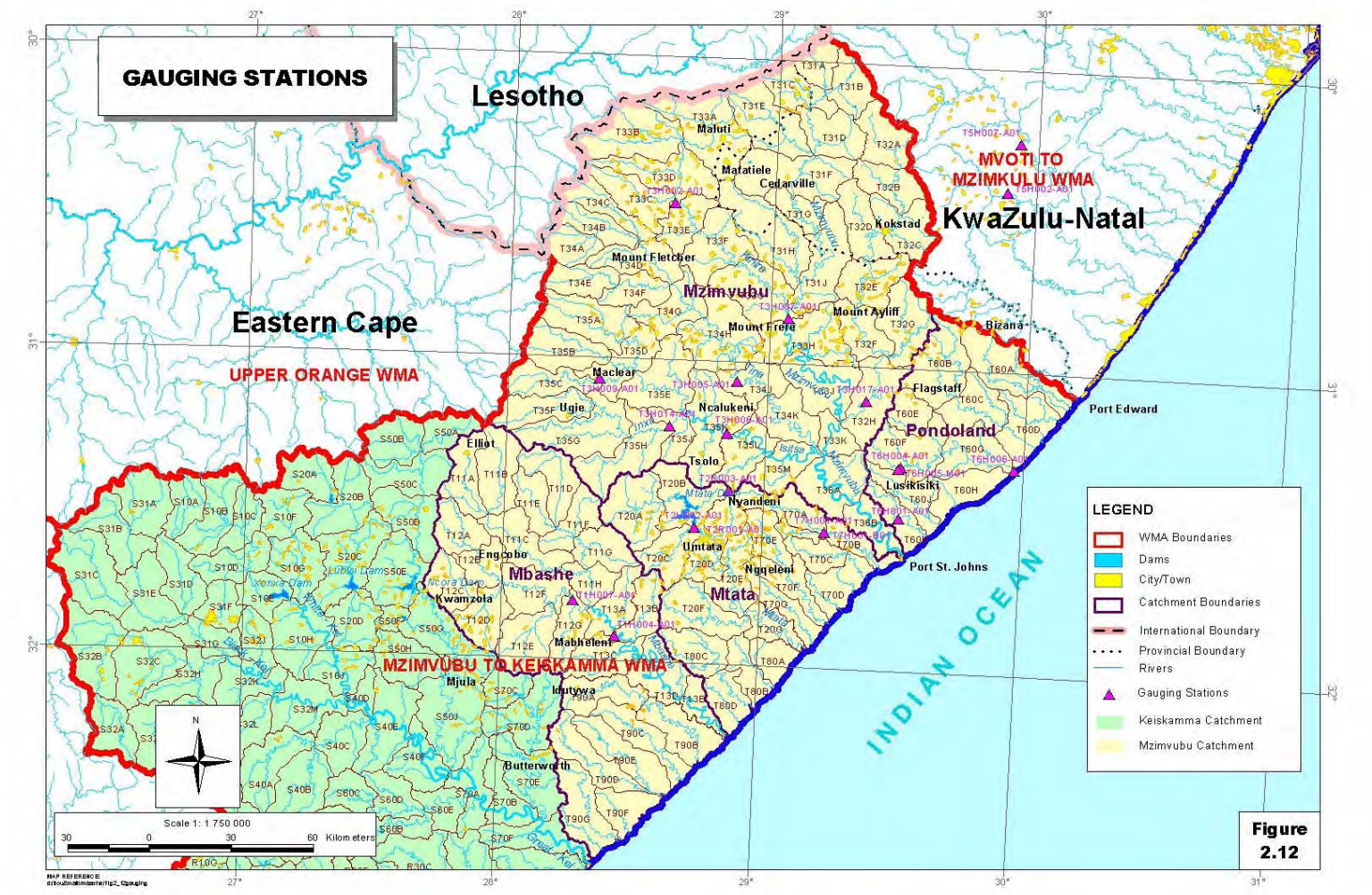
Dam Number	Name	Latitude			Longitude			Nearest Town	River	Type of Wall	Wall Height (m)	Length of crest (m)	Type of spillway	Capacity 103 m^3	Area (ha)	Size	Hazard Potential	Category
T304-34	Harbin Dam (SOL G.T.H)	30	25	5	28	54	47	Mataitele		Earthfill Dam	12	146	Side-Chanel Spillway	73	2	M	G	2
T304-36	Bon Accord No.2 Dam	30	20	30	28	53	45	Mataitele	Mzimvubu River	Earthfill Dam	6	730	Side Chanel Spillway	84	3	S	G	1
T304 -40	C.M Rawlins Dam	30	27	30	29	1	40	Cedarville	Mzimvubu River	Earthfill Dam	12	115	Open Channel	82	3	S	G	1
T304-52	Wicks Dam	30	29	40	29	13	21	Kokstad		Earthfill Dam	8	220	Side Chanel Spillway	125	4	S	G	1
T305-22	Kopjeskraal Dam	30	22	1	29	21	1	Franklin	Mzintlava River	Earthfill Dam	10	150	Side Chanel Spillway	149	5	S	G	1
T305-23	Dorset Dam	30	24	48	29	30	8	Kokstad	Mzintlava River	Earthfill Dam	11	205	Open Channel	671	24	S	G	1
T305-24	Sailors Gift Dam	30	27	1	29	34	1	Kokstad		Earthfill Dam	9	110	Side Chanel Spillway	74	5	S	G	1
T305-25	Dagster	30	37	1	29	33	1	Kokstad		Earthfill	8	180	Open	640	0.2	S	G	1

Dam Number	Name	Latitude			Longitude			Nearest Town	River	Type of Wall	Wall Height (m)	Length of crest (m)	Type of spillway	Capacity 103 m^3	Area (ha)	Size	Hazard Potential	Category
	Farm Dam									Dam			Channel					
T305-26	Glenking Dam	30	21	1	29	31	1	Franklin	Mzintlava River	Earthfill Dam	10	100	Open Channel	400	4	S	G	1
T306-17	Majola Dam-Transkei	31	30	30	29	20	15	Kuguduze	Nkankweni River	Earthfill Dam	14	100	Side-Chanel Spillway	379	9	M	B	2
T401-01	Ntenetyana Dam	30	46	50	28	56	20	Mount Frere	Ntenetyana River	Earthfill Dam	24	290	Open Channel	1500	50	M	B	2
T601-02	Magwa Dam	31	22	0	29	39	15	Lusikisi	Mkozi River/	Earthfill Dam	25	250	Side-Channel Spillway	133	19	M	B	2
T703-01	Mhlanga Dam	31	26	0	28	55	30	Mtata	Mhlanga River	Earthfill Dam	34	400	Side-Channel Spillway	1960	26	L	H	3

APPENDIX A2: LAND USE MAP



APPENDIX A3: FLOW GAUGING STATIONS THE MZIMVUBU TO MBASHE ISP AREA



APPENDIX A4: MAJOR INFRASTRUCTURE – WATER TREATMENT WORKS

ISP AREA	QUATS	NAME	OWNER/OPERATOR	CAPACITY (Ml/d)
AMATOLE				
	T90A	Idutywa	Mbashe Local Municipality	1.0
	T90C	Willowvale	Mbashe Local Municipality	0.7
	T90B	Mendu	Mbashe Local Municipality	0.15
	T90B	Lower Nqabara	Mbashe Local Municipality	
	T90B	Dwesa	Mbashe Local Municipality	0.22
	T90B	Cwebe	Mbashe Local Municipality	0.64
	T90G	Lower Qolora	Mbashe Local Municipality	0.075
OR TAMBO				
	T33H	Tabankulu	Ntabankulu Local Municipality	0.84
		Magwa		
	T32H	Flagstaff	Ingquza Local Municipality	0.6
	T60D	Mkambati	Ingquza Local Municipality	
		Holy Cross Hospital		
	T70B	Port St Johns	Port St Johns Local Municipality	1.1
	T60F	Lusikisiki	Ingquza Local Municipality	1.9
	T70D	Umzimvubu	Nyandeni Local Municipality	
	T70A	Libode	Nyandeni Local Municipality	3.5
	T20D	Corana	King Sabata Dalindyebo LM	0.72
	T70F	Ngqeleni	Nyandeni Local Municipality	0.4
	T70D	Lujecweni	Nyandeni Local Municipality	

ISP AREA	QUATS	NAME	OWNER/OPERATOR	CAPACITY (Ml/d)
	T20D	Madhovini and Ntsana	King Sabata Dalindyebo LM	
	T35J	Tsolo	Mhlontlo Local Municipality	1.1
	T20D	Mtata	King Sabata Dalindyebo LM	40
	T20B	Mhlahlane	King Sabata Dalindyebo LM	0.85
	T80A	Coffee Bay	King Sabata Dalindyebo LM	
	T20F	Mqanduli	King Sabata Dalindyebo LM	0.18
	T80C	Elliotdale	King Sabata Dalindyebo LM	0.24
	T80B	Zithulele hospital	King Sabata Dalindyebo LM	
CHRIS HANI				
	T11A	Elliot	Sakhisizwe Local Municipality	1.8
	T12B	Engcobo	Engcobo Local Municipality	0.95
	T12E	Mtangana	Engcobo Local Municipality	
UKHAHLAMBA				
	T35F	Ugie (Wildebees)	Elundini Local Municipality	0.8
	T35D	Maclear (Maclear dam)	Elundini Local Municipality	0.08
	T35D	Maclear (Mooi river)	Elundini Local Municipality	0.054
ALFRED NZO				
	T33A	Belfort (Maluti?)	Umzimvubu Local Municipality	1
	T35G	Mt Frere	Umzimvubu Local Municipality	1.1
	T32F	Mt Ayliff	Umzimvubu Local Municipality	0.84

APPENDIX A5: WASTE WATER TREATMENT WORKS

SCHEME NAME	SOURCE	TYPE OF TREATMENT	DESIGN CAPACITY Ml/d	UTILISATION	EFFLUENT DISPOSAL	QUARTS	COMPLIANCE %	POTENTIAL IMPACT TO RESOURCES
Amatole District Municipality								
Idutywa	Domestic	Oxidation Ponds	0.8			T90A		
Centane	Domestic	Oxidation Ponds				T90G		
Willowvale	Domestic	Septic tanks				T90C		
Oliver Tambo District Municipality								
Lusikisiki	Domestic	Digester wetland system	0.275		Lusikisiki river	T60F	70	
Lusikisiki Training College	Domestic	Oxidation ponds	0.092		Lusikisiki river		50	
Lusikisiki New Prison	Domestic	Oxidation ponds	0.07		Irrigation		No effluent	
St Elizabeth Hospital	Hospital	Oxidation ponds	0.086		Lusikisiki river		50	
Bambisana Hospital	Hospital	Activated sludge	0.058		Bambisana stream		70	
Flagstaff	Domestic	Conservancy tanks				T32H		

SCHEME NAME	SOURCE	TYPE OF TREATMENT	DESIGN CAPACITY Ml/d	UTILISATION	EFFLUENT DISPOSAL	QUARTS	COMPLIANCE %	POTENTIAL IMPACT TO RESOURCES
Flagstaff Prison	Domestic	Oxidation ponds	0.03		Evaporation		No effluent	
Holly Cross Hospital	Hospital	Activated sludge	0.089		Irrigation		50	
Tsolo	Domestic	Oxidation ponds	0.12		Xokonxa river	T35K	0	Raw sewage spilling into the river
Tsolo Agricultural College	Domestic	Oxidation ponds	0.12		Irrigation		No data	
St Lucy's Hospital	Hospital	Oxidation ponds	0.119		Irrigation		No effluent	
Mtata	Domestic Industrial	Biological Infiltration	12	138%	Mtata river	T20D	60	Requires upgrading
Mtata prison	Domestic	Oxidation ponds	1.4		Mtata river		60	
Group 46	Domestic	Oxidation ponds	0.03		Irrigation		No effluent	
14 SA1	Domestic	Oxidation ponds	0.15		River		70	
St Patricks School	Domestic	Oxidation ponds	0.1		River		50	
Nompumalanga School	Domestic	Activated sludge	0.12		River			
Efata School	Domestic	Oxidation ponds	0.1		Cicira river		50	

SCHEME NAME	SOURCE	TYPE OF TREATMENT	DESIGN CAPACITY Ml/d	UTILISATION	EFFLUENT DISPOSAL	QUARTS	COMPLIANCE %	POTENTIAL IMPACT TO RESOURCES
St Patrick's Hospital	Hospital	Oxidation ponds	0.09		None		No effluent	
Cicira College	Domestic	Activated sludge	0.093		Cicira river		50	
Bedford Hospital	Hospital							
Isimela Hospital	Hospital	Activated sludge	0.092		Snangwese river			
Ngqeleni	Domestic	Oxidation ponds	0.316		Evaporation	T70F	No effluent	Maintenance work required
Ndamase High School	Domestic	Activated sludge	0.167		Buntingoille river		No data, outlet inaccessible	
Canzibe Hospital	Hospital	Activated sludge	0.063		Ngododo river		60	
Qumbu	Domestic	Oxidation ponds	0.25		Evaporation	T35K	No effluent	
Nessie Knight Hospital	Hospital	Activated sludge	0.16		Sulenkana stream		70	
Bedford Hospital	Hospital	Oxidation ponds	0.081		Cicira river		No data, outlet inaccessible	
Tabankulu	Domestic	Septic tanks, bucket				T33H		

SCHEME NAME	SOURCE	TYPE OF TREATMENT	DESIGN CAPACITY Ml/d	UTILISATION	EFFLUENT DISPOSAL	QUARTS	COMPLIANCE %	POTENTIAL IMPACT TO RESOURCES
		system						
Tabankulu Prison	Domestic	Oxidation ponds	0.06		Evaporation		No effluent	
Libode	Domestic	Septic tanks, pit latrines				T70A		
St Barnabas Hospital	Hospital	Oxidation ponds	0.15		Ntlaza river		40	
St Magarettes Hospital	Hospital	Oxidation ponds	0.2		Evaporation		No effluent	
Elliotdale	Domestic	Septic tanks, pit latrines				T80C		
Elliotdale Prison	Domestic							
Elliotdale Police Station	Domestic							
Madwaleni Hospital	Hospital	Oxidation ponds	0.092		River		No data outlet inaccessible	
Mqanduli	Domestic	Oxidation ponds	0.2		Evaporation	T20F	No effluent	
Zithulele Hospital	Hospital	Activated sludge	0.063		Zitulele river	T80B	40	
Singisi Forest Products	Domestic, Industrial	Activated sludge	0.1		River		50	

SCHEME NAME	SOURCE	TYPE OF TREATMENT	DESIGN CAPACITY Ml/d	UTILISATION	EFFLUENT DISPOSAL	QUARTS	COMPLIANCE %	POTENTIAL IMPACT TO RESOURCES
Coffee bay						T80A		
Chris Hani District								
Engcobo	Domestic	Oxidation ponds	0.5		Cefara river	T12B	60	
Clarkebury	Domestic	Oxidation ponds	0.05		Irrigation		No effluent	
Nyanga High School	Domestic	Oxidation ponds	0.09		Kalinyanga stream		0	Raw sewage overflowing before inlet
Elliot	Domestic	Biological filtration	5		Slang river	T11A	60	
All Saints Hospital	Hospital	Activated sludge	0.15		Xuka river		80	
Mjanyane Hospital	Hospital	Biological filtration	0.086		Nyanyane river		70	
Greenville Hospital	Hospital	Oxidation ponds	0.07		River		60	
Ukhlamba District								
Ugie	Domestic	Evaporation ponds	0.043			T35F	No effluent	
Maclear	Domestic	Oxidation ponds	0.043		Mooi river but licenced to irrigate	T35C	70	Programme in place to upgrade

SCHEME NAME	SOURCE	TYPE OF TREATMENT	DESIGN CAPACITY Ml/d	UTILISATION	EFFLUENT DISPOSAL	QUARTS	COMPLIANCE %	POTENTIAL IMPACT TO RESOURCES
								works
Mt Fletcher	Domestic	Oxidation ponds	0.2		Evaporation	T34D	No effluent	
Mt Fletcher Prison	Domestic							
Taylor Bequest Hospital	Hospital	Oxidation ponds	0.076		None		No effluent	
Alfred Nzo District								
Maluti	Domestic	Conservancy tanks				T33A		
Maluti College	Domestic	Oxidation ponds	0.08		River		0	Raw sewage spilling into an open veldt
Maluti Military base	Domestic	Oxidation ponds	0.1		Evaporation		No effluent	
Sipetu Hospital	Hospital	Activated sludge	0.071		Sipetu river		40	
Mt Ayliff	Domestic	Oxidation ponds	0.1		Irrigation		50	
Mt Ayliff Hospital	Hospital	Activated sludge	0.042		Nkwenleni river		60	
Mzamba Village Market	Domestic, service industry	Activated sludge	0.03		River		40	

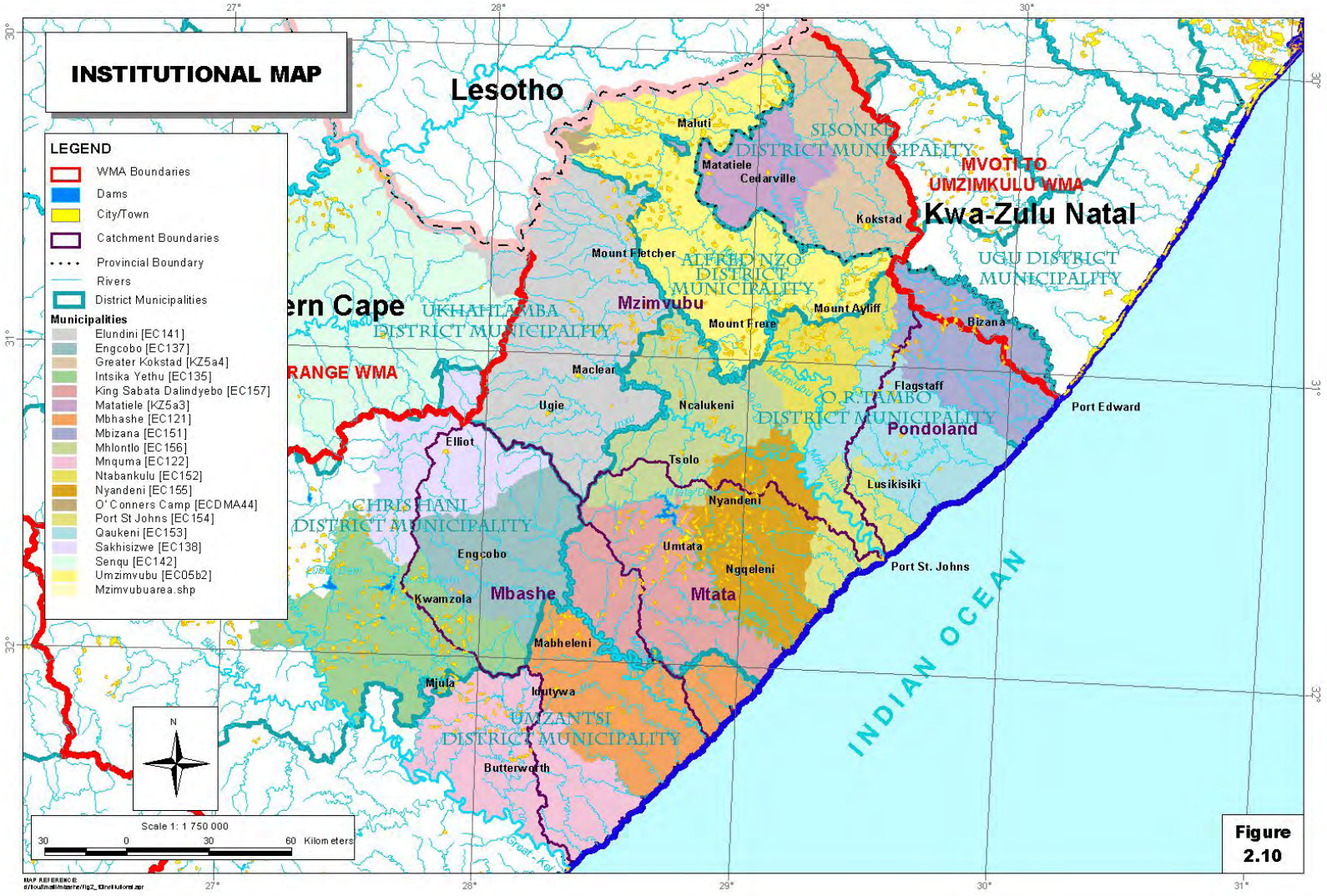
SCHEME NAME	SOURCE	TYPE OF TREATMENT	DESIGN CAPACITY Ml/d	UTILISATION	EFFLUENT DISPOSAL	QUARTS	COMPLIANCE %	POTENTIAL IMPACT TO RESOURCES
Riet Vlei Hospital	Hospital	Activated sludge	0.16		River		90	
Mt Frere								
Mary Teressa Hospital	Hospital	Oxidation ponds	0.15		Irrigation		No effluent	

APPENDIX A6: SOLID WASTE DISPOSAL SITES

TOWN	SIZE	STATUS OF APPLICATION	OWNERSHIP	COMMENTS
Oliver R Tambo District Municipality				
Elliotdale	Communal	Existing site without permit, in use	King Sabata Dalindyebo	No funds have been allocated for development of a new site
Mqanduli	Communal	Application submitted to DWAF	King Sabata Dalindyebo	New site developed and old one closed
Mtata	Medium	Existing site without permit, still being used	King Sabata Dalindyebo	No funds have been allocated for development of a new site
Ngeleni	Communal	Existing site without permit, in use	Nyandeni	No funds have been allocated for development of a new site
Libode	Communal	EIA process underway. Existing site without permit,still being used	Nyandeni	Funds available for the development of a new site
Tsolo	Communal	Existing site without permit, in use	Mhlontlo	Funds available for development of a new site
Lusikisiki	Communal	EIA process has stalled because of change in the municipal administration. Existing site without permit, still being used	Qaukeni	Funds available for development of a new site. Old site still in use
Qumbu	Communal	Application for permit for new site submitted to DWAF	Mhlontlo	New site developed and old one closed.
Flagstaff	Communal	Application for permit submitted to DWAF	Qaukeni	New site developed
Tabankulu	Communal	Existing site without permit, in use	Ntabankulu	No funds have been allocated for development of a new site
Port St Johns	Communal	Application for permit submitted to DWAF	Port St Johns	New site developed and old one closed

TOWN	SIZE	STATUS OF APPLICATION	OWNERSHIP	COMMENTS
Chris Hani District Municipality				
Engcobo	Communal	Application for permit submitted to DWAF	Engcobo	Existing site upgraded
Elliot	Small	Application for permit submitted to DWAF	Sakhisizwe	Existing site upgraded
Ukhahlamba District Municipality				
Ugie	Communal	Existing site without permit, in use	Elundini	New site identified
Maclear	Communal	Existing site without permit, in use	Elundini	No funds have been allocated for development of a new site
Mt Fletcher	Communal	Application of permit for new site submitted to DWAF. Existing site without permit still being used	Elundini	Development of new site underway
Alfred Nzo District Municipality				
Mount Frere	Communal	EIA process underway. Existing site without permit, still being used	Umzimvubu	Funds available for the development of a new site
Mount Ayliff	Communal	Application for permit submitted to DWAF	Umzimvubu	New site developed

APPENDIX A7: INSTITUTIONS INVOLVED IN WATER MANAGEMENT IN THE MZIMVUBU TO MBASHE ISP AREA



APPENDIX A8: OLD AND NEW MUNICIPALITIES

Old Transitional Local Council Name	New Local Municipality Name	New District Municipality Name
Centane	Mnquma	Amatole District Municipality
Idutywa	Mbashe	
Willowvale		
Mtata	King Sabata Dalindyebo	Oliver R.Tambo District Municipality
Mqanduli		
Elliotdale		
Ngqeleni	Nyandeni	
Libode		
Port St Johns	Port St Johns	
Tsolo	Mhlontlo	
Qumbu		
Flagstaff	Quakeni	
Lusikisiki		
Tabankulu	Ntabankulu	
Elliot	Sakhisizwe	Chris Hani District Municipality
Engcobo	Engcobo	
Maclear	Elundini	Ukhahlamba District Municipality
Ugie		
Mount Fletcher		
Matatiele	Umzimvubu	Sisonke District Municipality
Mount Frere		
Mount Ayliff	Greater Kokstad	
Kokstad		

APPENDIX A9: MAJOR INFRASTRUCTURE - INTER-BASIN TRANSFER

SCHEME	SOURCE	DESTINATION	APPROXIMATE PRESENT VOLUME Million m^3/a	POSSIBLE FUTURE VOLUME Million m^3/a	MAX. EXISTING CONVEYANCE CAPACITY Mm^3/a
Ncora	Great Kei Basin (Ncora Basin)	Mbashe Basin	105	Unknown	106

APPENDIX A10: MAJOR INFRASTRUCTURE – HYDROPOWER

QUATS	POWER STATION	RIVER/DAM	CURRENT MW	ADDITIONAL FUTURE MW	LOAD FACTOR	WATER REQUIREMENTS Million m^3/Gwh
T13D	Collywobbles	Mbashe River	3 x 14 MW Sets	14	Low (30 %)	2.96
T20D T20E	Mtata Falls 1 Mtata Falls 2	Mtata River Mtata River	2 x 3 MW Sets 2 x 5.5 MW Sets	6 MW 11 MW	 High	 5.4
	*Ncora	Tsomo River	1 x 1.6 MW Set 2 x 0.4 MW Sets	Unknown	Unknown	10.5

*The station is normally operated when water is released from the Ncora Dam to Collywobbles Power Station

APPENDIX A11: EXISTING WATER SUPPLY SCHEMES WITHIN AMATOLE DISTRICT MUNICIPALITY

QUATS	SCHEME NAME	RAW WATER SOURCE	POPULATION SUPPLIED	SCHEME CAPACITY			WTW Capacity (Ml/day)
				Mm^3/a	l/c/d	Limiting Factor	
T90C	Willowvale	Dam and RoR	2000	0.26	350	Treatment Capacity	0.7
T90A	Idutywa	Golf Course Dam	12000	0.30	68	Treatment Capacity	1.0
T80C	Elliotdale	RoR Weir	2000	0.09	120	Treatment Capacity	0.24
T90B	Mendu	Ngubukeya	7400	0.068	20	Source	0.15
T90B	Lower Nqabara	Nqabara RoR	7791				
T90B	Dwesa	Nqabara RoR	3235	0.08	20	Treatment Capacity	0.22
T90C	Willowvale/Gatyana	5 Boreholes	10146	0.15	40	Source	
T90G	Centane	13 Boreholes	800	0.05	170	Source	
T90G	Ncerana	2 Boreholes	1350	0.07	151	Source	
T90G	Lower Qolora	Qolora RoR	605	0.027	124	-	0.075
T90G	Ngicizele	4 Boreholes	3785	0.13	100	Source	-
T90B	Cwebe	Mbanyane RoR	6900	0.23	93	Treatment capacity	0.64
T90G	Lukhozi Mushonyane	Unknown					
T13D	Xobo	Unknown					
T12G	Exeni	Unknown					
T90E	Ntlabane	Unknown					
T80B	Zithulele hospital	Lubazi dam	Unknown				
T90E	Dadamba	Unknown					
T90E	Bongweni	Unknown					

APPENDIX A12: EXISTING WATER SUPPLY SCHEMES WITHIN OR TAMBO DISTRICT MUNICIPALITY

QUATS	SCHEME NAME	RAW WATER SOURCE	POPULATION SUPPLIED	SCHEME CAPACITY			WTW Capacity (Ml/day)
				Million m^3/a	l/c/d	Limiting Factor	
T33H	Tabankulu Town	Forest Dam	2100				0.84
	Magwa	Magwa Dam	5000				
T32H	Flagstaff	4 Boreholes and small dam	5300	0.18	94	Treatment Capacity	0.6
T60D	Mkambati	Mkambati River Weir	200				
	Sipaqeni	Unknown	27200				
	Holy Cross Hospital	Two small dams	1500	0.18			
T70B	Port St Johns	Lower Bulolwa Dam	6000	0.33	152	Treatment Capacity	1.1
T60F	Lusikisiki	Xura River weir	50000	0.57	32	Treatment Capacity	1.9
T70D	Umzimvubu	Umngazi River	25000		25		
T70A	Libode	Mhlanga Dam,	60000	0.78	36	Source	3.5
T20D	Corana	Corana Dam	47000	0.22	13	Treatment Capacity	0.72
T70F	Ngqeleni town	Nzwakazi Dam	3000	0.07	60	Treatment Capacity	0.4
T70E	Ngqeleni rural	Mtakatye River and Mtu River	23000 (1995)	0.85	60		
T35K	Qumbu Town	9 Boreholes	2000	0.04	60	Source	
T35J	Tsolo Town	Weir on Nqadu river	6000	0.16	73	Source	1.1

QUATS	SCHEME	RAW WATER	POPULATION	SCHEME CAPACITY	WTW

	NAME	SOURCE	SUPPLIED	Million m^3/a	l/c/d	Limiting Factor	Capacity (Ml/day)
T70F	Godini	Boreholes	2500				
T20D	Lower Gungululu	Protected springs	Unknown				
T70D	Lujecweni	Weir on stream	Unknown				
T70F	Kubhodi	Unknown					
T70C	Cwele	Boreholes					
T20D	Madhlovini and Ntsana	Mtata River	2000				
	Umtakula						
	Caba	Unknown					
	Qanda	Unknown					
T35E	Gqukunga	Unknown					
T35H	Minga	Unknown					
T20D	Mtata Town	Mtata Dam	150000	13.9	254	Treatment Capacity	40
T20B	Mhlahlane	Mabeleni Dam	28000	0.26	25	Treatment Capacity	0.85
T80A	Coffee Bay	Mtata river	1500(1996)	0.11	60		
T20F	Qunu	Unknown					
T11G	Baziya	Unknown					
T20F	Mqanduli Town	Manqondo Dam	8000	0.11	60	Treatment Capacity	0.18
T20B	Majika	Sendeko stream, boreholes	2000				
T20D	Emtebe	Borehole, spring	8700				

APPENDIX A13: POSSIBLE FUTURE BULK WATER SUPPLY SCHEMES

DISTRICT MUNICIPALITY	CATCHMENT	SCHEME	RAW WATER SOURCE	ESTIMATED YIELD
		Gatyana Water Supply Scheme		
AMATOLE	T90B	Mqabara Water Supply Scheme		
	T90G	Qora Water Supply Scheme		
	T90E	Qwaninga –8 Water Supply Scheme		
	T90B	Shixini Water Supply Scheme		
	T90E	Nqadu - 1 Water Supply Scheme		
	T90C	Bende – 1 Water Supply Scheme		
	T90B	Mhlohlozi Water Supply Scheme		
	T13D	Sundwane Water Supply Scheme		
OR TAMBO	T60F	Extension of Lusikisiki Water Supply Scheme	Groundwater	
	T33J	Umzimvubu Surface Water Supply Scheme	Mzimvubu river	
	T32F	Mzintlava Surface Water Supply Scheme	Mzintlava river	
	T60D	Mkambati Regional Water Scheme	Mtentu, Mzamba river	
		Second Falls (East) Water Supply Scheme	Mtata river	
	T70G	Mtakaye Water Supply Scheme		
	T70C	Mngazana Regional Water Supply Scheme		
	T20B	Extension of Mhlahlane Water Supply Scheme		
	T20D	Extension of Mtata Water Supply Scheme	Mtata dam	

DISTRICT MUNICIPALITY	CATCHMENT	SCHEME	RAW WATER SOURCE	ESTIMATED YIELD
		Second Falls Water Supply Scheme		
	T13A	Mgwali Water Supply scheme	Mgwali river	
	T20F	Extension of Mqanduli Water Supply Scheme		
	T11G	Extension of Baziya Water Supply Scheme	Springs	
CHRIS HANI	T12B	Engcobo Bulk Water Supply Scheme		
		Engcobo Rural Water Supply Scheme		
		Engcobo Regional Water Supply Scheme		
UKHAHLAMBA	T34B	Mt Fletcher Rural Bulk Supply		
	T35F	Ugie Upgrade Water Supply		

APPENDIX A14: RESERVE DETERMINATIONS CONDUCTED IN THE ISP AREA

Quat	WMA	Surface water resource	Water uses	Quantity Level	EC	PESC	RD approved
T11C	Mzimvubu to Keiskamma			Desktop	B/C	C	6/20/2002
T11E	Mzimvubu to Keiskamma	Upper Bashe River	a,b.d	Desktop		C	7/27/2000
T11H	Mzimvubu to Keiskamma	Upper Bashe River	d	Desktop	D	D	9/12/2003
T12G	Mzimvubu to Keiskamma	Upper Bashe River	d		D	D	9/12/2003
T13A	Mzimvubu to Keiskamma	Upper Bashe River	d	Desktop	D	D	9/12/2003
T13D	Mzimvubu to Keiskamma	Ncihana River	d	Desktop	C	C	11/26/2002
T13E	Mzimvubu to Keiskamma		d	Desktop		C	9/12/2003
T20A	Mzimvubu to Keiskamma	Mtata River		Rapid 1		C	5/8/2001
T20B	Mzimvubu to Keiskamma		d	Rapid 1		C	5/8/2001
T20C	Mzimvubu to Keiskamma	Mtata River	d	Rapid 1		C	5/8/2001
T20D	Mzimvubu to Keiskamma	Mtata River	d			C	5/8/2001
T20E	Mzimvubu to Keiskamma	Mtata River	d	Desktop	C		5/8/2001
T20G	Mzimvubu to Keiskamma		a	Desktop	C	C/D	9/30/2002
T31C	Mzimvubu to Keiskamma	Mzimvubu River	a.b,d	Desktop		B	7/27/2000

Quat	WMA	Surface water resource	Water uses	Quantity Level	EC	PESC	RD approved
T31H	Mzimvubu to Keiskamma	Mvenyane River	d	Desktop	B		6/20/2002
T31J	Mzimvubu to Keiskamma	Umzimvubu River	a,b,c,d,f,g,i	Rapid 3	A/B	A/B	9/11/2003
T32E	Mzimvubu to Keiskamma	Mvalweni River	d	Desktop	C	C	6/20/2002
T32H	Mzimvubu to Keiskamma		a,c,d,l			C	9/12/2003
T33K	Mzimvubu to Keiskamma	Upper Umzimvubu	d	Desktop	C	C	9/12/2003
T34C	Mzimvubu to Keiskamma	Ntata River	a,b,c,d,f,g,i	Rapid 3		C	10/1/2003
T34D	Mzimvubu to Keiskamma	Tina River		Desktop	B/C	C	3/19/2004
T34H	Mzimvubu to Keiskamma	Umzimkulu River	a,c,d,i	Desktop	C		8/29/2003
T34J	Mzimvubu to Keiskamma	Tina River	a,b,c,d,f,g,l	Rapid	B/C	B/C	8/26/2003
T34K	Mzimvubu to Keiskamma	Manzana River	d	Desktop	C	C	6/20/2002
T35K	Mzimvubu to Keiskamma	Tsitsa River	a,c,d,i	Desktop			10/27/2003
T36A	Mzimvubu to Keiskamma	KuNdokwana	d	Desktop	B	B	11/26/2002
T36B	Mzimvubu to Keiskamma		d		B	B	9/12/2003
T40D	Mvoti to Mzimkulu	Mtamvuna River	d	Desktop			3/12/2002
T40E	Mvoti to Mzimkulu	Mtamvuna River	a,b,d	Desktop		B	7/27/2000

Quat	WMA	Surface water resource	Water uses	Quantity Level	EC	PESC	RD approved
T51H	Mvoti to Mzimkhulu	Umzimkulu River	a,b,d	Desktop		C	7/27/2000
T52E	Mzimvubu to Keiskamma	Little Bisi River	d	Desktop			3/15/2004
T52G	Mvoti to Mzimkulu	Umzimkhulu River	d	Desktop	C	C	1/7/2003
T52H	Mvoti to Mzimkulu	Bisi River	a,b,d	Desktop		C	7/27/2000
T60F	Mzimvubu to Keiskamma	Eastern Pondoland Coastal Area	d	Desktop	B	B	5/7/2004
T60J	Mzimvubu to Keiskamma			Desktop	A	A	2/10/2003
T60K	Mzimvubu to Keiskamma		a.c.d.I	Desktop	B	B	3/15/2004
T70A	Mzimvubu to Keiskamma	Mngazi River	a,b	Desktop		B	3/24/2001
T70C	Mzimvubu to Keiskamma	Mgazane River	a,c,d,i	Desktop	B	B	5/19/2004
T70E	Mzimvubu to Keiskamma	Mtakatye River	a,b,d	Rapid 1		B	5/7/2004
T70G	Mzimvubu to Keiskamma	KuNkunzimbini River	d		A/B	B	12/11/2002
T80A	Mzimvubu to Keiskamma	Nenga River	a,b	Rapid 3		C	3/7/2001
T80A	Mzimvubu to Keiskamma	Nzulwini River	a,b	Rapid 3		B	3/2/2001
T80A	Mzimvubu to Keiskamma	Mpako River	a,b	Rapid 3		B	3/7/2001
T80B	Mzimvubu to Keiskamma	Mncwasa River	d	Rapid 1		B	5/8/2001

Quat	WMA	Surface water resource	Water uses	Quantity Level	EC	PESC	RD approved
T80C	Mzimvubu to Keiskamma	Xora River	d	Rapid 1		B	5/8/2001
T80D	Mzimvubu to Keiskamma	Mbanyane River	a,b	Rapid 3		B	3/7/2001
T80D	Mzimvubu to Keiskamma	Xora River	a,b,d	Rapid 1		B	5/8/2001
T90B	Mzimvubu to Keiskamma	Nqabara River	a,b	Rapid 1		B	3/2/2001
T90C	Mzimvubu to Keiskamma			Desktop	B	B	3/15/2004
T90E	Mzimvubu to Keiskamma		a,c,d,l	Desktop		B	3/15/2004

Table A15: ESTUARIES

Estuary	Condition	Classification	Information	Comments
Bulolo	Good	Temporarily open/closed	Poor	Two traffic causeways traverse the system
Bulungula	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Cebe	Excellent	Temporarily open/closed	Poor	The Cebe Nature Reserve camp site is situated near the estuary mouth
Gqunqe	Excellent	Temporarily open/closed	Poor	No ecological information
Great Kei	Fair	Permanently open	Moderate	Catchment degradation has resulted in heavy siltation of the estuary
Gxara	Good	Temporarily open/closed	Poor	Water quality measurements indicate contamination
Hluleka (Majusini)	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Jujura	Good	Temporarily open/closed	Poor	Poor water quality
Kobonqaba	Good	Permanently open	Poor	Reduced water quality due to high Ecoli counts
Ku- Amanzimuzama	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Ku- Mpenzu	Excellent	Temporarily open/closed	Poor	Causeway crosses upper reaches of the system
Kwanyana	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Lupatana	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Lwandilana	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Lwandile	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Mapuzi	Excellent	Temporarily open/closed	Poor	Used by commercial fishermen as ski boat launch site
Mbashe	Good	Permanently open	Moderate	Poor catchment has led to siltation of the estuary
Mbhanyana (Ku-	Excellent	Temporarily open/closed	Poor	In Cwebe Nature Reserve

Estuary	Condition	Classification	Information	Comments
Bhula)				
Mbotyi	Good?	Temporarily open/closed	Poor	Baseline studies urgently required
Mdumbi	Poor	Permanently open	Poor	Potion of the floodplain is used for subsistence agriculture
Mendu	Excellent	Temporarily open/closed	Poor	In Dwesa Nature Reserve
Mgwegwe	Excellent	Temporarily open/closed	Poor	Situated within Mkambati Nature Reserve
Mgwegtyana	Excellent	Temporarily open/closed	Poor	Situated within Mkambati Nature Reserve
Mkozi	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Mkweni	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Mncwasa	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Mnenu	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Mngazana	Good	Permanently open	Good	Diverse flora and fauna contribute to great conservation potential
Mngazi	Good	Permanently open	Poor	Coastal resort of Umngazi River Bungalows situated at the mouth
Mntafufu	Excellent	Permanently open	Moderate	Wide variety of natural habitats make this a very valuable estuary
Mnyameni	Excellent?	Temporarily open	Poor	Baseline Studies urgently required
Mpahlane	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Mpahlanyana	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Mpako	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Mpande	Excellent	Temporarily open/closed	Poor	Some of the floodplain has been used for subsistence agriculture
Msikaba	Excellent	Permanently open	Moderate	Forms southern boundary of Mkambati Nature Reserve
Mtakatye	Excellent?	Permanently open	Poor	Baseline studies urgently required

Estuary	Condition	Classification	Information	Comments
Mtambane	Fair	Temporarily open/closed	Poor	Campsite and caravan park situated on the estuary floodplain
Mtata	Good	Permanently open/closed	Moderate	Water quality and catchment management issues need to be addressed
Mtentu	Excellent	Permanently open	Poor	Forms the northern boundary of the Mkambati Nature Reserve
Mtentwana	Good	Temporarily open/closed	Poor	Infrastructural developments by Pondoland Sun Hotel
Mtonga	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Myekane	Excellent?	Temporarily open/closed	Poor	Baseline studies urgently required
Mzamba	Good	Permanently open	Moderate	Water quality issues need to be addressed
Mzintlava	Excellent?	Permanently open	Poor	Baseline studies urgently required
Ncizele	Excellent	Temporarily open/closed	Poor	System appears to be in near natural state
Nenga	Good	Temporarily open/closed	Poor	Existing floodplain impacted by road and other infrastructural developments
Ngadla	Good	Temporarily open/closed	Poor	Poor water quality
Ngogwane	Fair	Temporarily open/closed	Poor	Poor water quality and floodplain disturbance by vehicle access routes
Ngoma (Kobule)	Excellent	Temporarily open/closed	Poor	In Dwesa Nature Reserve
Ngqusi/Inxaxo	Excellent	Permanently open	Poor	Wave Crest holiday resort on southern shore near mouth
Ngqwara	Excellent	Temporarily open/closed	Poor	Floodplain and surrounding area used for grazing cattle
Nkanya	Excellent	Temporarily open/closed	Poor	System is in near pristine condition
Nkodusweni	Excellent	Temporarily open/closed	Poor	Baseline studies urgently required

Estuary	Condition	Classification	Information	Comments
Nqabara	Excellent	Permanently open	Poor	Mangrove stands present in estuary
Ntlonyane	Excellent	Temporarily open/closed	Poor	Mouth of the floodplain and surrounding area used for cattle grazing
Ntlupeni	Excellent	Temporarily open/closed	Poor	Popular recreational venue for local community
Qolora	Excellent	Temporarily open/closed	Poor	System appears to be in near natural state
Qora	Excellent	Temporarily open/closed	Poor	System is regularly used for recreational boating and fishing
Sandlundlu	Good	Temporarily open/closed	Poor	Private ownership with conservation potential
Shixini	Good	Permanently open	Poor	Poor water quality
Sihlontlweni (Gcini)	Excellent	Temporarily open/closed	Poor	No information available
Sikombe	Excellent?	Temporarily open	Poor	Baseline studies urgently required
Sinangwana	Excellent	Temporarily open/closed	Poor	Some of the floodplain has been used for subsistence agriculture
Umzimpunzi	Excellent	Temporarily open/closed	Poor	Baseline studies urgently required
Xora	Excellent	Permanently open	Poor	Exceptionally important system in need of further study
Zalu	Excellent	Temporarily open/closed	Poor	Small floodplain and surrounding area used for grazing cattle

APPENDIX B1: GROUNDWATER RESOURCES OVERVIEW

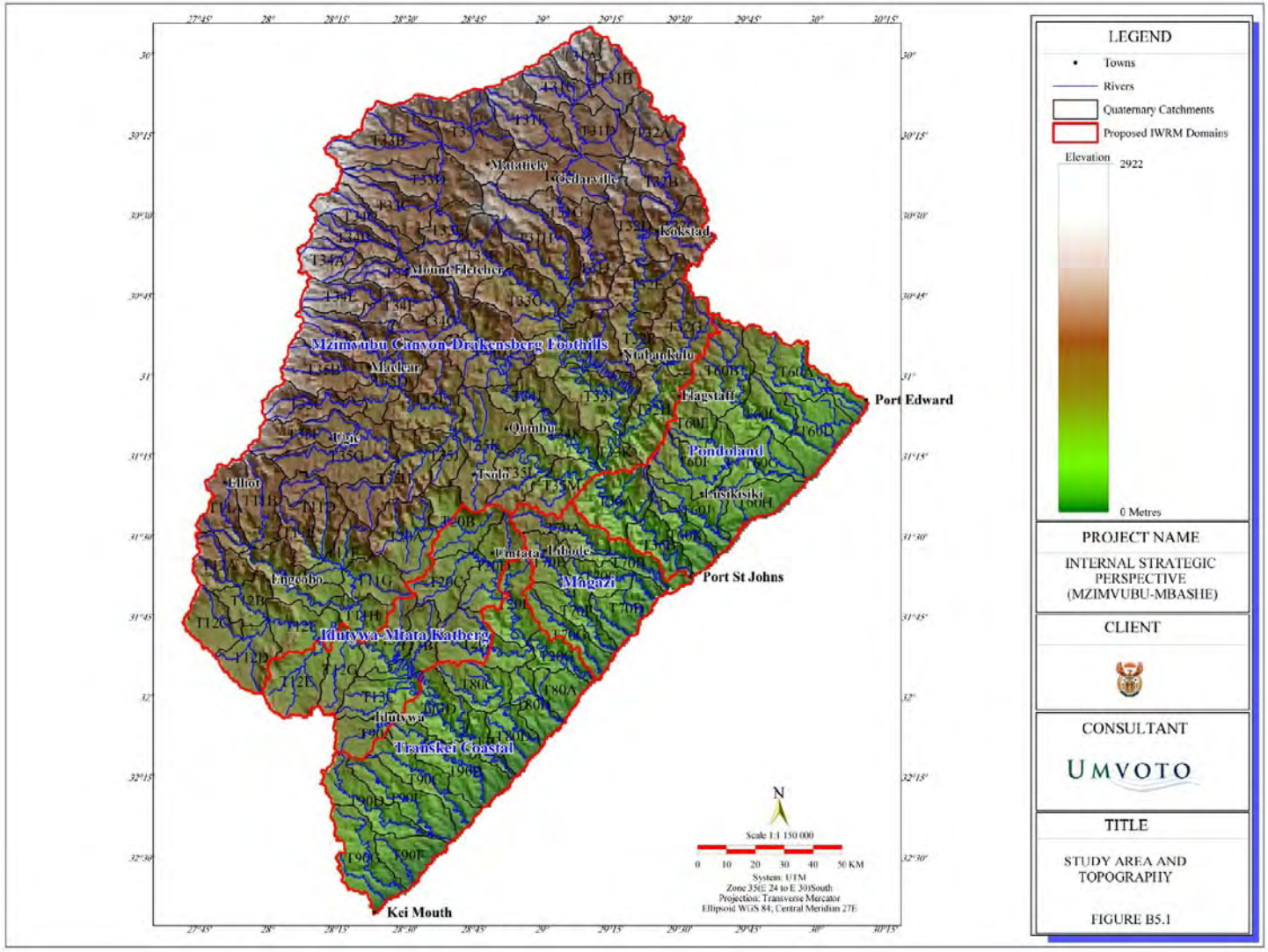
APPENDIX B1.1 GEOLOGY AND HYDROGEOLOGY

The topography (refer to Figure B5.1), drainage and groundwater quality throughout the area reflects the underlying geology (refer to Figure B5.2 and Table 3.1), which is dominated by the Mapumulo Metamorphic Complex and associated igneous intrusives, Msikaba Formation (Witteberg Group?), Ecca Group, and lower Beaufort Group (Adelaide Subgroup) on the coastal plateau, and the upper Beaufort Group (Tarkastad Subgroup), Molteno Formation, Elliot Formation, Clarens Formation, and Drakensberg Formation in the uplands area. Major Karoo dolerite sills and dykes are also conspicuous features of the geology. There are minor coastal exposures of cretaceous conglomerates (Mngazana, Mbotyi and Mzamba Formations around Port St Johns and Port Edward, but these are too small to be represented on a regional map (Fig. 3.2). Areas of Tertiary-Quaternary alluvial gravel and sand occur in the Cedarville Flats (T31 drainage) and near Matatiele (T33 drainage).

Table B1.1 summarises the catchments that fall within each of the hydrogeological provinces or IWRM domains recommended for this ISP area. (See also Figures B5.1 and B5.2). The Transkei-Pondoland Lowlands and the Mbashe-Mzimvubu Uplands Hydrogeological Provinces respectively consist of three and two subareas. (The former is the NE extension of the Eastern Cape Lowlands province in the Amatole-Kei ISP area, and the latter is an eastern extension of the Amatola-Stormberg Uplands province in the same ISP Area.)

The regional tectonic history and sedimentary type control the porosity, permeability and transmissivity, i.e., the hydraulic characteristics of the different aquifer types (Figure B5.2) and therefore the accessibility of the groundwater in them. The discussion below addresses the four factors that require consideration, viz., abstractability, volume or yield, water quality, and affordability.

The major portion of the WMA is underlain by a shallow “regolith” (intergranular/weathered-and-fractured) aquifer (yellow area in Figure B5.2). The true fractured-rock aquifer systems in this ISP area (green areas in Figure B5.2) include the Msikaba Formation (Witteberg sandstone equivalents in the east; T60A, -D, -G, -H), the Katberg sandstone (extending as a tapering wedge from the Kei River boundary to Mtata), and the Clarens sandstones near the northwestern and northern boundary). Another fractured-rock system (black areas in Figure B5.2) is represented by the Karoo dolerites (throughout the region) and Drakensberg basalts (along the north-western divide). Primary intergranular (porous sandy) aquifers occur most extensively in the northern part of the WMA (purple areas in Figure B5.2). These truly “primary” or “intergranular” aquifers are found on the older land surfaces in the foothills of the Drakensberg where deep erosional incisions along the Mzimvubu River channel have not yet penetrated.


LEGEND
Towns
Rivers
Quaternary Catchments
Proposed IWRM Domains
Elevation
2922
0 Metres
PROJECT NAME
INTERNAL STRATEGIC PERSPECTIVE (MZIMVUBU-MBASHE)
CLIENT
CONSULTANT
UMVOTO
TITLE
STUDY AREA AND TOPOGRAPHY
FIGURE B5.1
Mzimvubu Canyon-Drakensberg Foothills
Idutywa-Mtata-Katberg
Transkei Coastal
Port Edward
Port St Johns
Kei Mouth
Matatiele
Cedarville
Kokstad
Mount Fletcher
Mackear
Qumbu
Flagstaff
Ntabankulu
Pondoland
Lusikisiki
Elliot
Tsolo
Umtata
Libode
Mqanduli
Engcobo
Idutywa
N
Scale 1:1 150 000
0 10 20 30 40 50 KM
System: UTM
Zone 35E 24 to E 30South
Projection: Transverse Mercator
Ellipsoid WGS 84; Central Meridian 27E

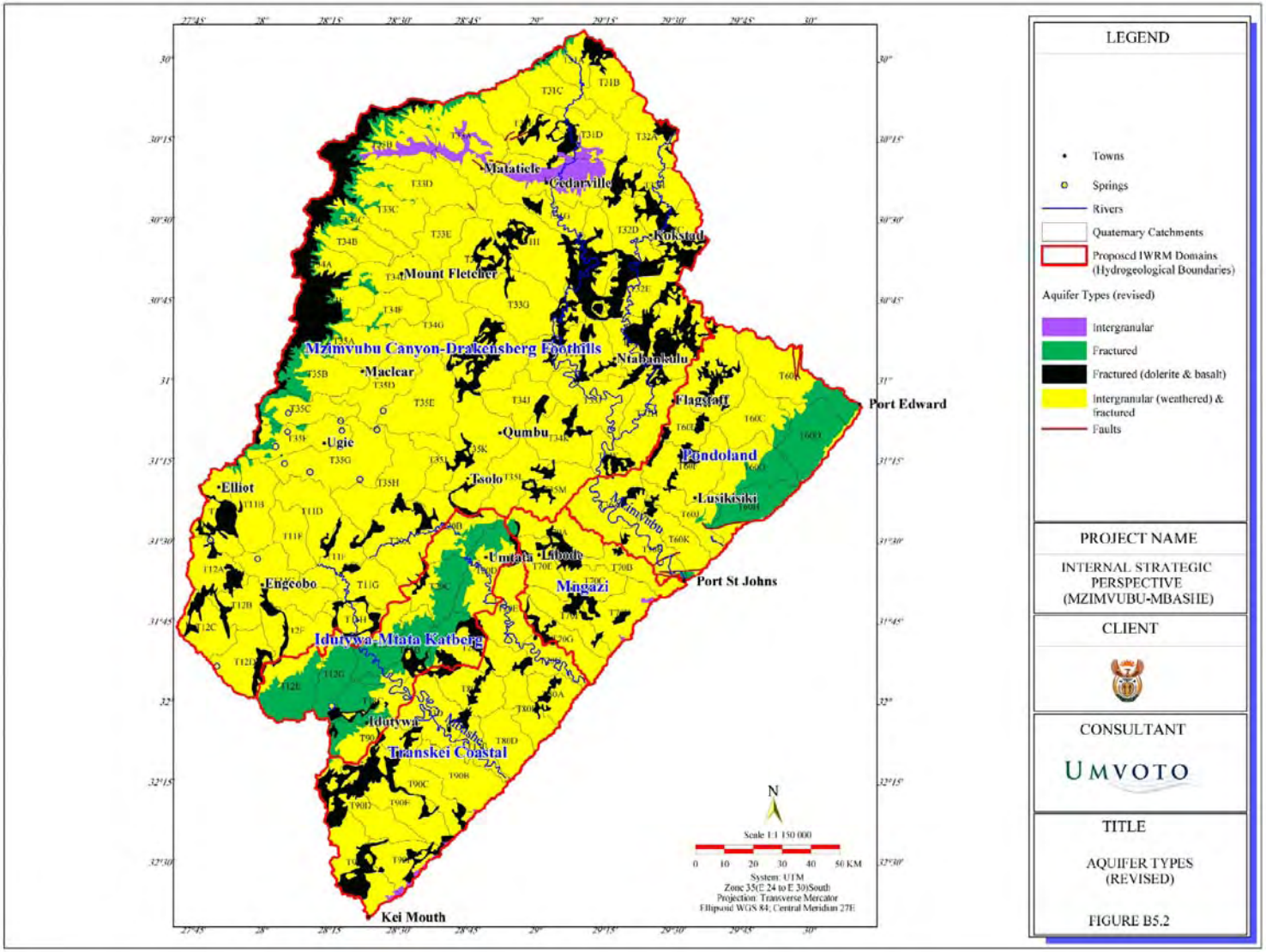

LEGEND
Towns
Springs
Rivers
Quaternary Catchments
Proposed IWRM Domains (Hydrogeological Boundaries)
Aquifer Types (revised)
Intergranular
Fractured
Fractured (dolerite & basalt)
Intergranular (weathered) & fractured
Faults
PROJECT NAME
INTERNAL STRATEGIC PERSPECTIVE (MZIMVUBU-MBASHE)
CLIENT
CONSULTANT
UMVOTO
TITLE
AQUIFER TYPES (REVISED)
FIGURE B5.2
Mzimvubu Canyon-Drakensberg Foothills
Iduriywa-Mtata Katberg
Transkei Coastal
Matatiele
Cedarville
Kokstad
Mount Fletcher
Maclear
Ugie
Elliot
Engcobo
Qumbu
Tsolo
Umtata
Libode
Nkankalla
Flagstaff
Pondoland
Lusikisiki
Magazi
Port Edward
Port St Johns
Kei Mouth
N
Scale 1:1 150 000
0 10 20 30 40 50 KM
System: UTM
Zone 35(E 24 to E 30)South
Projection: Transverse Mercator
Ellipsoid: WGS 84; Central Meridian 27E

Table B1.1: Hydrogeology of the Mzimvubu to Mbashe region

Hydrogeological Province (Subprovince)	Tertiary (Quat.) Catchments	Geology/Hydrogeology	Preferred Groundwater Targets
Transkei-Pondoland Lowlands			
Transkei Coastal	T90 (less part of T90A), T80, T13B-E (less parts of T13B-C), T20D-G	Karoo dolerites Adelaide Subgroup Ecca Group	Karoo dyke and sill contacts in Adelaide Subgroup of upper T80 & T90;
Mngazi	T70	Karoo dolerites Tarkastad Subgroup (in downfaulted blocks) Adelaide Subgroup Ecca Group	Karoo dyke and sill structures; Katberg sandstone near fault zones of Mngazi Mouth
Pondoland	T60 (plus T36A-B)	Karoo dolerites Adelaide Subgroup Ecca Group (incl. Dwyka Fm) Msikaba Formation (Margate Facies of Natal Group) Mapumulo Metamorphic Suite	Karoo dyke and sill structures Msikaba fractured sandstone
Mzimvubu to Mbashe Uplands			
Idutywa-Mtata Katberg	Parts of: T90A, T12E&G, T13A-C, T20B-D&F	Karoo dolerites Burgersdorp Formation Katberg Formation	Karoo dyke and ring (sill) structures; Fractured Katberg sandstone
Mzimvubu Canyon-Drakensberg Foothills	T11, T12, T20A-B (part), T31, T32, T33, T34, T35	Tertiary-Quaternary alluvials Karoo dolerites Drakensberg Formation Clarens Formation Elliot Formation Molteno Formation Burgersdorp Formation Adelaide Subgroup (in NE) Upper Ecca Group (in NE)	Alluvials in Cedarville Flats area; Karoo dyke and ring (sill) structures, in conjunction with sandstone members in otherwise generally shale units (e.g., Indwe Sandstone in Molteno Formation)

The mapped distribution of springs in this WMA appears strange, being confined to the upper Mbashe (T11-T12) and western Mzimvubu (T35) catchments. It is impossible to correlate this distribution with any conceivable geological controls. There are surely many other springs in this WMA that are not shown in the available database (Figure B5.2). The Sinuka Spring near Port St Johns is one such

The borehole distributions documented in the National Groundwater Data Base (NGDB) and in the DWAF (Eastern Cape) records are shown in Figures B5.3 and B5.4, respectively. The density of the boreholes illustrates the dominance of groundwater usage in the Matatiele-Kokstad district (from shallow alluvial aquifers; Figure B5.2), and along the Katberg sandstone axis SW of Mtata (Figure 3.3). There is an uneven spread of boreholes throughout the rest of the ISP area, with localised concentrations along the divide with the lower Kei River, between Maclear and Mtata, and around Flagstaff and Lusikisiki. Except in the alluvial and Katberg

instances mentioned above, the borehole distribution pattern does not seem to reflect geological controls such as the underlying or exposed pattern of dolerite dykes and sills, but this may be due to inadequate representation of dolerites at this map scale.

Towns that are reported to be dependent on groundwater supplies are Mount Fletcher, Ntabankulu and Tsolo (Figure B5.4).

The hydrogeological significance of possible intrusive ring structures in the Kentani area north of Kei Mouth remains to be explored. Parts of the dolerite outcrop between Idutywa and Kei Mouth appear to be linked to a subsurface circular feature evident from the recently compiled (2000) aeromagnetic anomaly maps at 1:1 000 000 scale.

The area of highest median yield (2-5 l/s) is around the primary aquifer and dolerite intrusions north of Cedarville and Matatiele (Figure B5.5), but paradoxically much lower yields (0.1-0.5 l/s) are obtained from similar primary aquifers west of Matatiele. Over the rest of the WMA the median yields are generally uniform between 0.5 and 2 l/s, except along the Dwyka Formation around Lusikisiki in the east and in the Ecca-lower Beaufort Group around Kentani in the south where lower median yields are reported (Figure B5.5). Notably, yields from the Katberg Formation are not higher than from the adjacent regolith aquifer overlying the Adelaide and Burgersdorp mudstone aquitards.

APPENDIX B1.2 GROUNDWATER RECHARGE

The recharge to the aquifers is highest (75-110 mm/yr; Figure B5.6) along the coast between Port St Johns and Port Edward, favouring the Msikaba fractured-rock aquifer in Pondoland as a sustainable source. In contrast to this and to its rainfall-favoured situation within the adjacent Amatole-Kei ISP Area, the Katberg sandstone aquifer SW of Mtata receives a lesser amount of recharge (37-50 mm/yr; Figure B5.6). The yields obtained to date (Figure B5.5), the recharge distribution (Figure B5.6), and the relatively small scale or local to sub regional aquifers that comprise the dolerite dykes and sills (Figure B5.2) indicate that groundwater is best suited for rural and small town supply.

APPENDIX B1.3 GROUNDWATER HARVEST POTENTIAL

Table 3.2 compares different estimates of recharge per ISP sub-area. The Harvest and Exploitation Potential take into account the limitations of aquifer storage and accessibility/affordability. It is expected that the Harvest Potential should be less than the Recharge estimates and/or recharge less baseflow. The recharge estimates (Umvoto in press) are made on the basis of the average of three different models using the WR90 climate data, and the area of each aquifer outcrop in any particular quaternary catchment.

The values for groundwater usage are as per Baron and Seward (2000). The modelled usage (not presented) is in excess of this. It was derived using the 1:500 000 DWAF hydrogeology map series on yield and the number of boreholes documented in the NGDB for the areas. This illustrates either the high percentage of dry boreholes and or the large number of boreholes currently not in use. Groundwater use is not monitored. Since March 2003 there has been an initiative to monitor usage, water quality and management and maintenance practices. No information is currently available. A benchmark study assessing the status of boreholes was undertaken in '91/92 but this information is not available in hard copy, neither in DWAF's Mtata office nor in digital copy in the PE office.

Table B1.2 is based on in-house modelling undertaken by Umvoto (Hay, Rieman and Mlisa in press) and on an estimate of the recharge per ISP key area based on the Groundwater Resources of the Republic of South Africa map Sheets 1 and 2 (Vegter 1995). These numbers will be refined once digital data is available for these map sheets. The Harvest Potential and the Exploitation potential are derived from the digital data of the relevant Hydrogeological map series and from DWAF (2001).

Table B1.2: Estimate of recharge per ISP key area

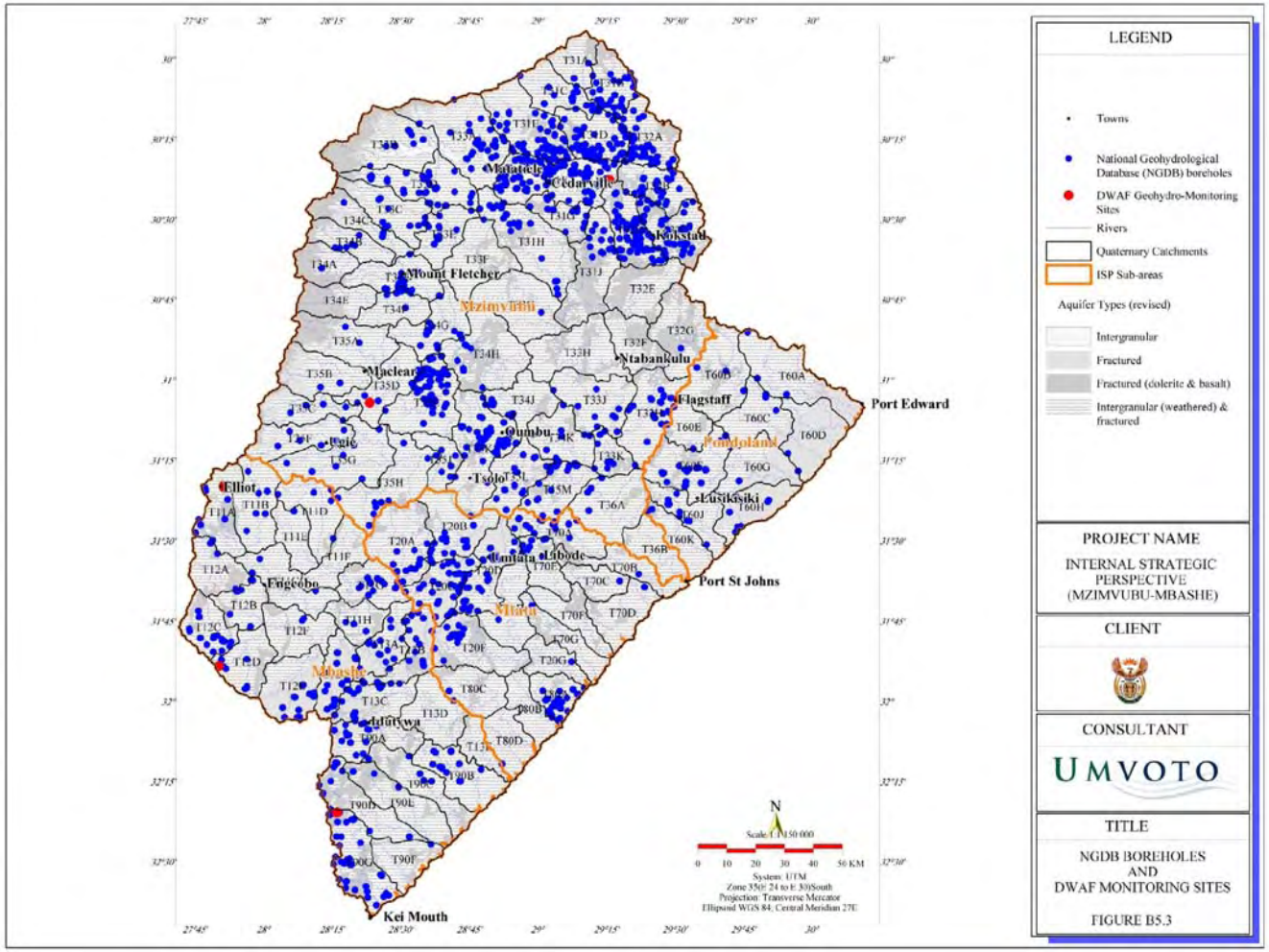
	Recharge (Vegter & Seymour, 1995)		Base Flow (Vegter & Seymour 1995)		Recharge (Umvoto 2004) Mm³/a	Recharge less Baseflow(1)		Harvest Potential (Seymour 1996)	Exploitation Potential (WSM 1996)
	mm/a	million m3/a	mm/a	Million m³/a		Vegt Mm³/a	Umv Mm³/a	Mm³/a	Mm³/a
Mbashe Mzimvubu	45	390	25	217 *55%*	440	*173* 260	293 *223*	461	232
Pondoland	55	304	35	193 *63%*	310	*111* 203	207 *117*	285	137
Mtata	70	261	50	186 *71%*	260	*75* 174	173 *74*	353	173
	55	1091	25	496 *45%*	1009	*595* 727	668 *513*	823	432
TOTAL		2046		1092 *53%*	2019	954	927	1922	974

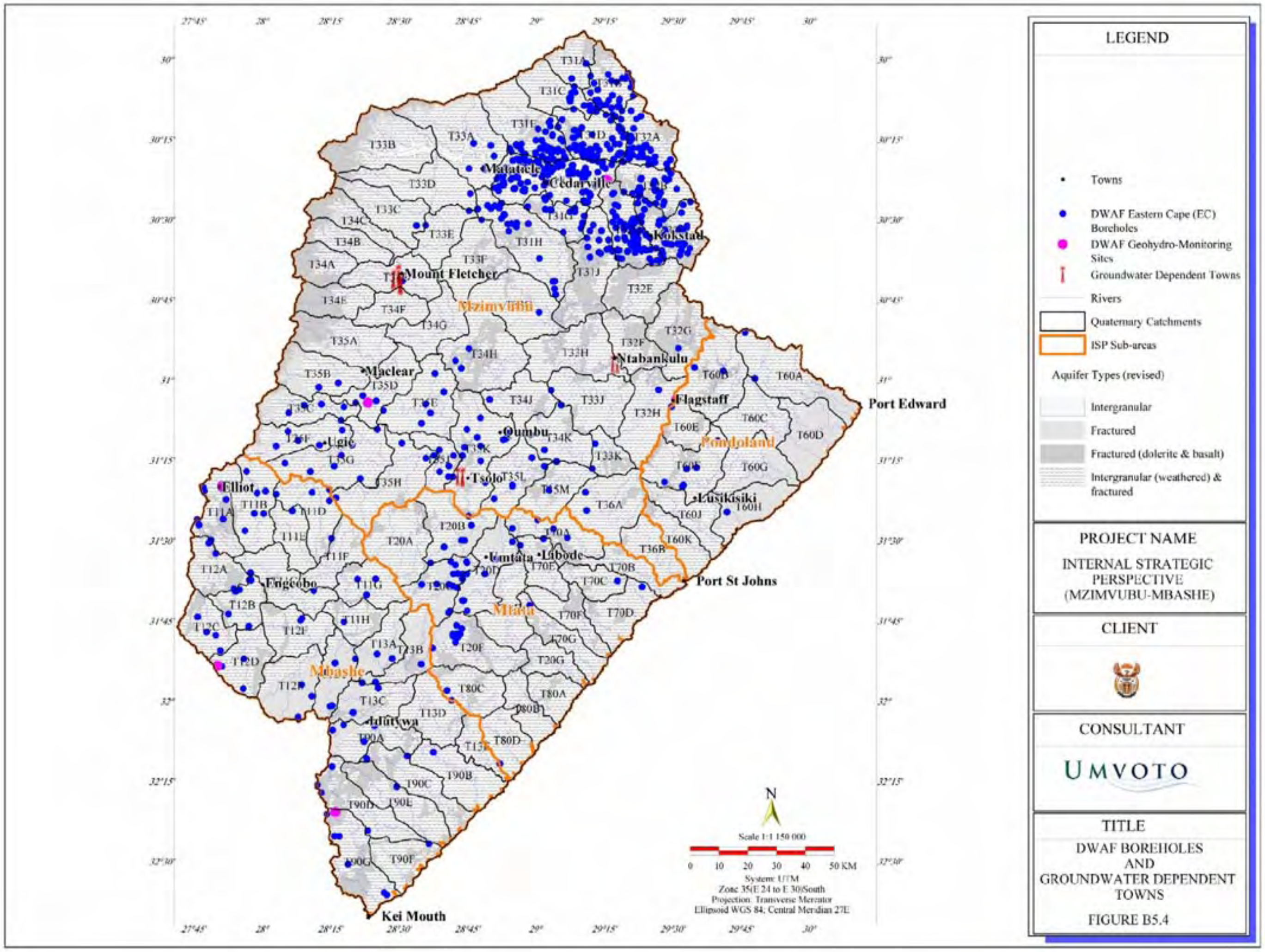
Note: Harvest potential should be less than the recharge estimate baseflows

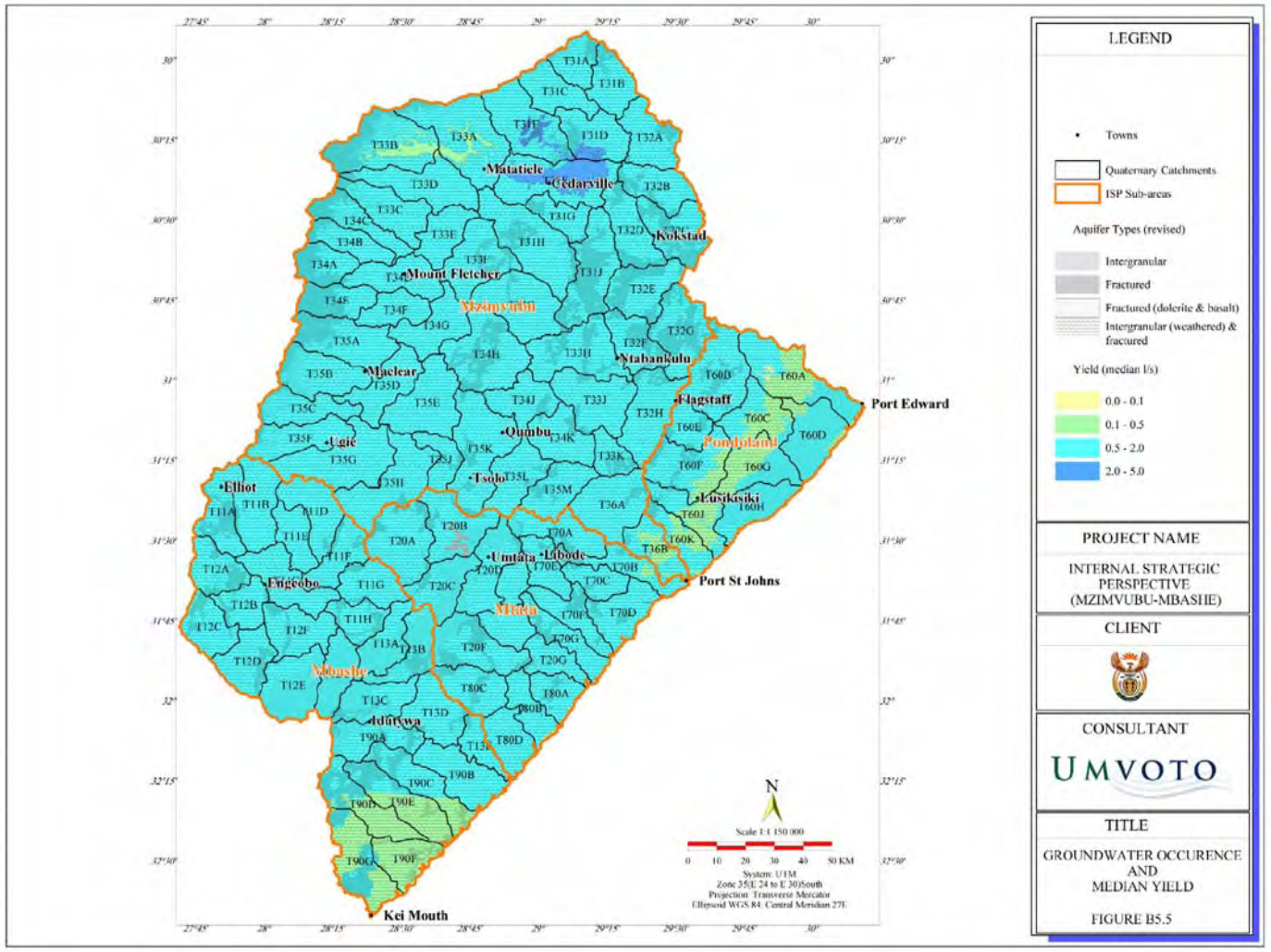
(1) The numbers in italics in the sixth column are the Vegter and Umvoto recharge numbers less the Vegter baseflow contribution

(2) The numbers not in italics are the Vegter and Umvoto recharge numbers less standard one third of these for baseflow contribution. The Umvoto recharge model assumes no lateral recharge. It is not documented but assumed that this is true for the Vegter model.

If one assumes that all groundwater recharge less that which is discharged as baseflow is available over a year and that 50% of the groundwater is accessible then the usable groundwater per ISP sub area is summarized in Table B1.3.


LEGEND
Towns
National Geohydrological Database (NGDB) boreholes
DWAF Geohydro-Monitoring Sites
Rivers
Quaternary Catchments
ISP Sub-areas
Aquifer Types (revised)
Intergranular
Fractured
Fractured (dolerite & basalt)
Intergranular (weathered) & fractured
PROJECT NAME
INTERNAL STRATEGIC PERSPECTIVE (MZIMVUBU-MBASHE)
CLIENT
CONSULTANT
UMVOTO
TITLE
NGDB BOREHOLES AND DWAF MONITORING SITES
FIGURE B5.3
Mount Fletcher
Maclear
Ugie
Elliot
Engcobo
Mbashe
Idutywa
Kei Mouth
Mzimvubu
Tsolo
Qumbu
Mthatha
Libode
Ntabankulu
Flagstaff
Lusikisiki
Port St Johns
Port Edward
Pondoland
N
0 10 20 30 40 50 KM


LEGEND
Towns
DWAF Eastern Cape (EC) Boreholes
DWAF Geohydro-Monitoring Sites
Groundwater Dependent Towns
Rivers
Quaternary Catchments
ISP Sub-areas
Aquifer Types (revised)
Intergranular
Fractured
Fractured (dolerite & basalt)
Intergranular (weathered) & fractured
PROJECT NAME
INTERNAL STRATEGIC PERSPECTIVE (MZIMVUBU-MBASHE)
CLIENT
CONSULTANT
UMVOTO
TITLE
DWAF BOREHOLES AND GROUNDWATER DEPENDENT TOWNS
FIGURE B5.4
Mount Fletcher
Matatiele
Cedarville
Kokstad
Mzimvubu
Ntabankulu
Maclear
Flagstaff
Port Edward
Qumbu
Ugie
Pondoland
Tsolo
Lusikisiki
Elliot
Umtata
Libode
Port St Johns
Engcobo
Mbashe
Mtata
Idutywa
Kei Mouth
N
Scale 1:1 150 000
0 10 20 30 40 50 KM
System: UTM
Zone 35(E 24 to E 30)South
Projection: Transverse Mercator
Ellipsoid WGS 84; Central Meridian 27E


LEGEND
Towns
Quaternary Catchments
ISP Sub-areas
Aquifer Types (revised)
Intergranular
Fractured
Fractured (dolerite & basalt)
Intergranular (weathered) & fractured
Yield (median l/s)
0.0 - 0.1
0.1 - 0.5
0.5 - 2.0
2.0 - 5.0
PROJECT NAME
INTERNAL STRATEGIC PERSPECTIVE (MZIMVUBU-MBASHE)
CLIENT
CONSULTANT
UMVOTO
TITLE
GROUNDWATER OCCURENCE AND MEDIAN YIELD
FIGURE B5.5
Matatiele
Cedarville
Kokstad
Mount Fletcher
Maclear
Ntabankulu
Flagstaff
Port Edward
Qumbu
Tsolo
Elliot
Lusikisiki
Port St Johns
Umtata
Libode
Engcobo
Mbashe
Idutywa
Kei Mouth
N
Scale 1:1 150 000
0 10 20 30 40 50 KM
System: UTM
Zone 35/E 24 to E 30/South
Projection: Transverse Mercator
Ellipsoid WGS 84: Central Meridian 27E

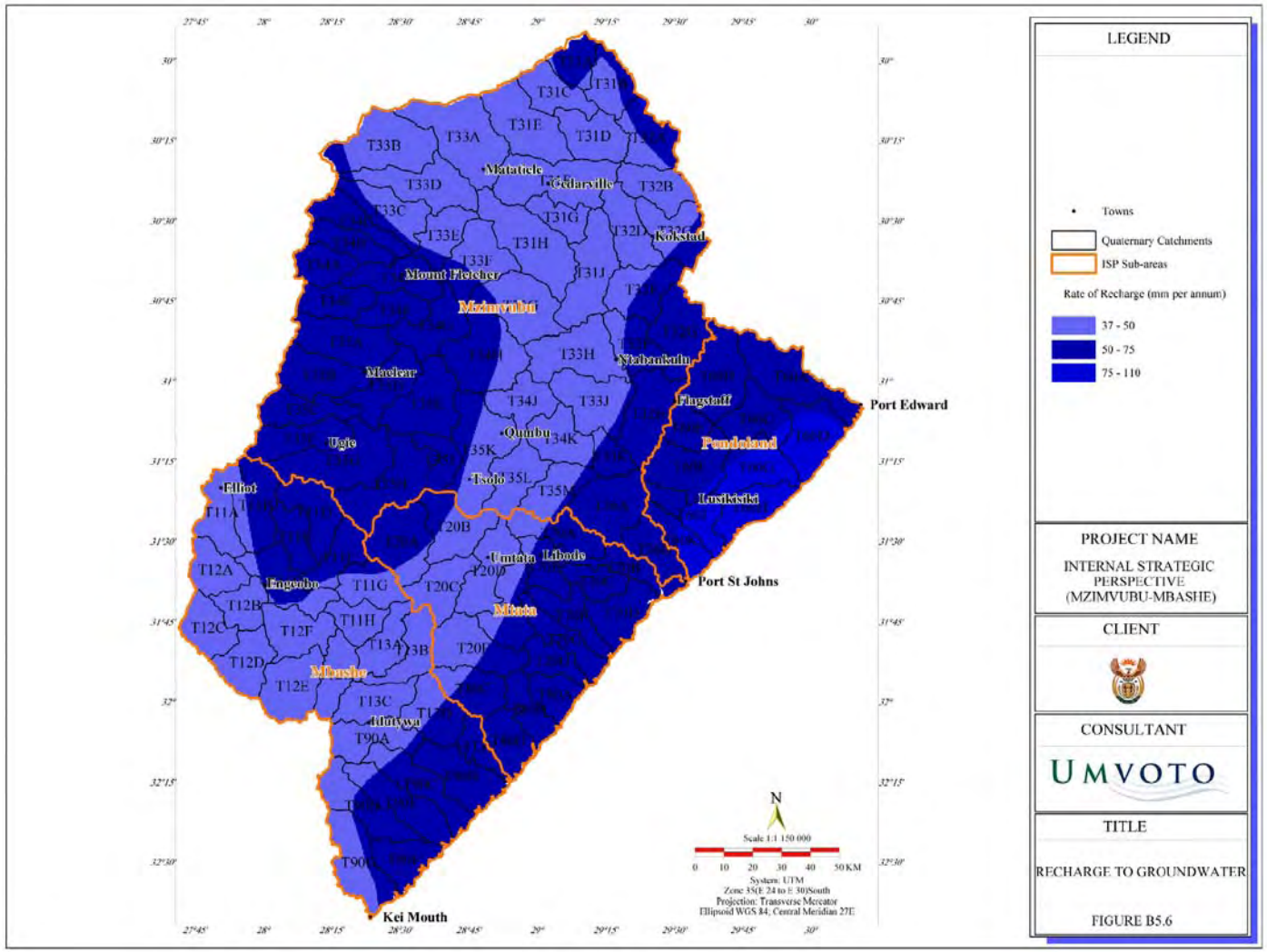

LEGEND
Towns
Quaternary Catchments
ISP Sub-areas
Rate of Recharge (mm per annum)
37 - 50
50 - 75
75 - 110
PROJECT NAME
INTERNAL STRATEGIC PERSPECTIVE (MZIMVUBU-MBASHE)
CLIENT
CONSULTANT
UMVOTO
TITLE
RECHARGE TO GROUNDWATER
FIGURE B5.6
Matatiele
Cedarville
Kokstad
Mount Fletcher
Mzimvubu
Maclear
Ugie
Elliot
Qumbu
Tsolo
Ntabankulu
Flagstaff
Port Edward
Pondoland
Lusikisiki
Port St Johns
Umtata
Libode
Engcobo
Mbizana
Mbashe
Idutywa
Kei Mouth
N
Scale 1:1 150 000
0 10 20 30 40 50 KM
System: UTM
Zone 35(E 24 to E 30)South
Projection: Transverse Mercator
Ellipsoid WGS 84; Central Meridian 27E

Table B1.3: Estimate of allocable groundwater per ISP key area (million m³/a)

ISP key area	Recharge less Baseflow		50% of Total Recharge Allocable		50% of Recharge less Baseflow Allocable	
	Vegter	Umvoto	Vegter	Umvoto	Vegter	Umvoto
Mzimvubu	595	513	545	504	298	256
Wild CoastPondoland	75	74	130	130	37	37
Mtata	111	117	152	155	55	58
Mbashe	173	223	195	220	86	111
TOTAL	954	927	1022	1009	476	462

Table B1.4: Groundwater exploitation potential per key area (million m³/a)

	Groundwater Available Conservative Case ♦		Groundwater in Use / Yield (Baron & Seward 2000)		Groundwater Unexploited Conservative Case		Groundwater Unexploited Base Case♦		Exploitation Potential
	Vegter	Umv	mm/a		Vegter	Umv	Vegt	Umv	WSM 2001
Mzimvubu	298	256	1.3		297	255	545	504	432
Pondoland	37	37	0.9		36	36	130	130	173
Mtata♥	55	58	2.7/1.5		52	55	152	155	137
Mbashe	86	111	1.4		85	110	195	220	232
TOTAL	476	462	6.2		470	456	1022	1009	974

♦ The conservative case is assumed to be 50% of recharge less discharge or contribution to baseflow. Thus it implicitly (but not aquifer specific) takes into account the effect of limited storage or accessibility.

♥ The estimated usage was adjusted by Baron and Seward as per a factor developed in a workshop.

♦ The Base case is assumed to be 50% of recharge i.e implicitly takes into account storage and baseflow if baseflow is established at a standard 30% of recharge.

It appears that the Exploitation Potential is comparable to the Base Case viz. that it does not take into account contribution to base flow or potential impact on the environmental Reserve. It is evident that a significant amount

of groundwater held in storage throughout this area is undeveloped. It is also evident that quantifying surface and groundwater interaction in time and space is a critical factor in resource evaluation in this area as is improved evaluation of aquifer storage and up to date estimate of usage.

Appendix B1.3.1 Groundwater use in the Mzimvubu to Mbashe ISP area

The following towns depend upon or to an extent rely on groundwater supply. The town supply is summarized in the table below.

Table.B1.5: Main towns dependent on groundwater supply

Quats	Scheme Name	Groundwater Details	Population Supplied	Scheme Capacity			WTW Capacity (Ml/day)
				Million m^3/a	L/c/d	Limiting Factor	
Amatole District Municipality							
T90C	Willowvale/Gatyana	5 boreholes	10 146	0.15	40	Source	-
T90G	Centane	13 boreholes	800	0.05	170	Source	-
T90G	Ncerana	2 Boreholes	1 350	0.07	151	Source	-
T90G	Ngicizele	4 boreholes	3 785	0.13	100	Source	-
Total			16 081	0.4			
OR Tambo District Municipality							
T32H	Flagstaff	4 boreholes and small dam	5 300	0.18	94	Treatment Capacity	0.6
T70F	Godini	Boreholes	2 500				
T20D	Lower Gungululu	Protected Springs	Unknown				
T70C	Cwele	Boreholes					
T35K	Qumbu Town	9 boreholes	2 000	0.04	60	Source	
T20D	Emtebe	Borehole and Spring	8 700				
Total			18 500	0.22			
Chris Hani District Municipality							
T12B	Engcobo Town	Boreholes and 2 streams	11 000	0.21	52	Source	
T12A	Mtangana	Springs, boreholes	16 000	0.14	24	Source	

				Scheme Capacity			
		and Mtangana Dam					
Total			27 000	0.35			
Ukhahlamba District Municipality							
T34B	Mt Fletcher	Boreholes	11 500	0.05	12	Source	
	AZDM						
T33H	Mnceba	Protected Springs, Boreholes and weir	29 000	0.63	60	Source	
Total			40 500	0.68			
Cum Total			102 081	1.65			

In some instances detailed information was not available. There is no information for Tsolo (T35K), Tabankulu (T33H/T32F). Libode (T70 E) was supplied by boreholes but now is supplied from the Umhlanga Scheme. There were two boreholes of which one remains active as a supplementary source. Kokstad (T32D/C) relies on the Crystal Spring for a portion of its supply. It is suspected that further information is outstanding.

What is not easily understood is the discrepancy between the unexploited groundwater resource determined by Vegter and this study and the statement that supply of the above groundwater schemes is limited by the source.

Sanitation

The impact of sanitation and (mis)management of WwTWs is significant for groundwater quality. Not all WwTWs are licenced but the following towns have water-borne sewerage and treatment works; Mtata (T20D) (licenced), Umzimkulu, Mount Ayliff (T32F), Mount Frere (completion expected in 2 years), Lusikisiki (T60F) (not the whole town, also pit latrines and septic tanks), Encobo(T12B/T11C) (licenced), Elliot (T11A) (licenced), and Maclear (T35B) (not the whole town). Ugie (T35F) does not have reticulated sewerage.

All sewerage works and improper implementation of sanitation programmes pose a threat to the groundwater quality in these areas. Where the WwTWs are inadequate, waste water flows directly into the surface water streams and pollutes surface water and indirectly the groundwater via recharge from the rivers. In general the rivers are located along zones of weakness related to lithological change or structural features.

Lined pits require ongoing maintenance. These skills and insight transfer do not happen on construction contracts where the Regulations and Specifications for Rural Sanitation infrastructure do not take cognizance of daily life and the process of ablution. Cholera outbreaks can follow on large gatherings; this relates to concentrated stress on sanitation and water supply resources and poor hygiene practices. The result poses a threat to aquifers and surface water.

There is no requirement when tendering that the technical capacity to do the work must be demonstrated. It is not appropriate that tenderers undertake the geotechnical or vulnerability evaluation of whether toilets need to be

lined or unlined since this has cost benefit implications for them.

Cholera is usually found in people and not in the river. In 2003 cholera was found both in the river downstream of Mtata as well as in groundwater in the NW sector of the Mbashe key area. The associated biological pollutants and the challenge of chlorinating a local borehole supply are of concern.

For groundwater supply/delivery and management to be successful and to contribute to sustainable development at community level and sustainable livelihoods at individual level the implementation process cannot be kept separate from the Sanitation Programme and related education and economic drives to improve people's lives. To be effective roads and other services are also required. This is a co operative governance issue that has a significant impact on groundwater resource protection and sustainability.

Springs

A Spring Inventory was undertaken in 2001/ 2002 but this information is not yet available on GIS or in a report. There is limited quantitative understanding of variations in spring discharge with climate variations, snow fall and natural impacts on base flow versus anthropogenic or abstraction influence. Current documentation of existing springs is inadequate. Current understanding of the relationship of different aquifers to spring flow and baseflow at quaternary catchment level is undocumented or unavailable and is not considered in either surface water or groundwater management or regulatory decisions.

APPENDIX B1.4 GROUNDWATER QUALITY

It is generally expected that the groundwater quality (Figure B5.7) will be controlled by aquifer lithology and geochemistry. Accordingly groundwater quality will vary significantly between the fractured-rock aquifers and the "intergranular (weathered) and fractured" or regolith aquifers that overlie generally impermeable shale-dominated formations. In the adjacent Amatole-Kei WMA, the true fractured-rock aquifers generally have a TDS of less than 300 mS/m, whereas the regolith aquifer yields groundwater with a TDS greater than 300 mS/m and as high as 2000 mS/m.

This expected relation is not observed in the Mzimvubu to Mbashe ISP area. A relative recharge disadvantage, combined with a stratigraphic thinning and facies change, may explain the lesser water quality from the Katberg fractured-rock aquifer in this WMA (Figure B5.7). Groundwater from boreholes in the Katberg near Idutywa has an electric conductivity (EC) in the range 70-300 mS/m, and the EC reaches >300 mS/m where the Katberg wedges out close to Mtata. Clearly the quality of Katberg groundwater declines north-eastwards, away from the main Katberg recharge area in the Amatole Mountains of the adjacent ISP Area.

The localised occurrence of very poor quality groundwater near Port St Johns is associated with the Sinuka thermal springs, probably related to the faults transecting the lower Mzimvubu River (Figure B5.7).

The groundwater over most of the ISP area is generally of very good quality (EC < 70 mS/m) and therefore most suitable for use in small towns and rural settlements where there are no surface water schemes. The evident disparity between the recharge (Figure B5.6) and the groundwater occurrence and median yield map indicates that the groundwater potential warrants re-examination or that groundwater rapidly discharges to the surface water (runoff) in this area. In either instance from the aquifer vulnerability map (Figure 3.2) it appears that it underestimated the aquifer vulnerability to contamination throughout the area.

Any reported contamination in this ISP area poses a grave threat to the groundwater of the greater region. In the

larger and smaller urban centres throughout the ISP area it is imperative that operators of the WwTWs appreciate that the aquifers are vulnerable to contamination. In the rural areas it is necessary that the importance of spring protection and well-head protection is appreciated and understood.

The potential of groundwater in this ISP area to contribute to poverty alleviation and empowerment of small-scale and emerging farmers is significant. The success would involve upgrading of agricultural practise and possibly improved irrigation practises. In the rural towns' and villages' groundwater can be better managed and developed for conjunctive use.

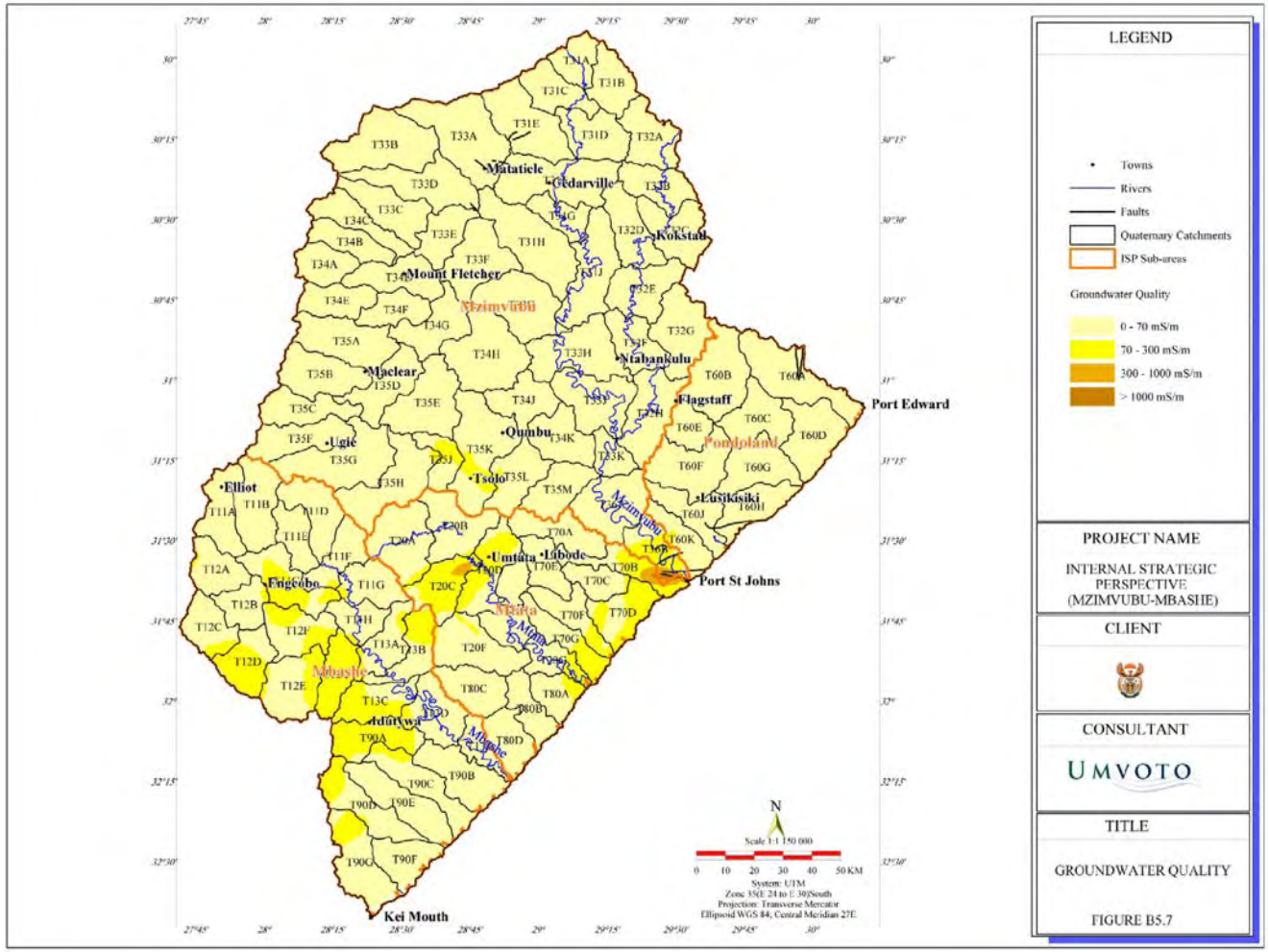
The proposed division of the area into hydrogeological provinces is also based on the most likely patterns of surface and groundwater interaction so that conjunctive use of surface and groundwater can be better understood and managed. Given the flood hydrology pattern of the Eastern Cape, the reliance on groundwater in the dry season and in droughts, and with the high evaporation rates, it is imperative that the full hydrological cycle is mapped and quantified to realise IWRM objectives.

Groundwater Pollution and Monitoring

The regional variation in water quality is controlled by aquifer lithology (see Figure B5.7 and B5.8). A WRC-funded study undertaken by Proff Fatoki of Fort Hare University established very low levels of cadmium in the Mtata River. It is postulated by Martin Labuschagne that this may result from factories in Mtata discharging factory effluent directly into the river. It is necessary that trace elements are analysed for both surface and groundwater routine monitoring. Pyrites has been detected at Tabankulu. This could arise from trace elements in the dolerites since this is near the sulphide-rich deposits of the Insizwa Intrusion (copper nickel deposit).

Data collection is severely limited throughout the ISP area due to infrastructure constraints and to human resource limitations. There is no routine faecal coliform testing at springs. There is a difficulty of sampling springs for water quality as no accepted and standard methodology, particularly for uncontaminated springs, is in place.

There is no monitoring capacity outside of larger towns. It is necessary that decisions as to whether DWAF should undertake this until such time as capacity within local government is secure, be taken and the necessary action co-ordinated. There is limited to no data validation. Relevant information arising from available projects and contracts is not input into the regional data system.


LEGEND
Towns
Rivers
Faults
Quaternary Catchments
ISP Sub-areas
Groundwater Quality
0 - 70 mS/m
70 - 300 mS/m
300 - 1000 mS/m
> 1000 mS/m
PROJECT NAME
INTERNAL STRATEGIC PERSPECTIVE (MZIMVUBU-MBASHE)
CLIENT
CONSULTANT
UMVOTO
TITLE
GROUNDWATER QUALITY
FIGURE B5.7
Matatiele
Cedarville
Kokstad
Mount Fletcher
Maclear
Ntabankulu
Flagstaff
Port Edward
Qumbu
Pondoland
Tsolo
Lusikisiki
Elliot
Ugie
Umtata
Libode
Port St Johns
Engcobo
Mbashe
Kei Mouth
Mzimvubu
N
Scale 1:1 150 000
0 10 20 30 40 50 KM
System: UTM
Zone 35(E 24 to E 30)South
Projection: Transverse Mercator
Ellipsoid WGS 84; Central Meridian 27E